MOTOR TREND

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1961 PONTIAC TEMPEST TRANSAXLE

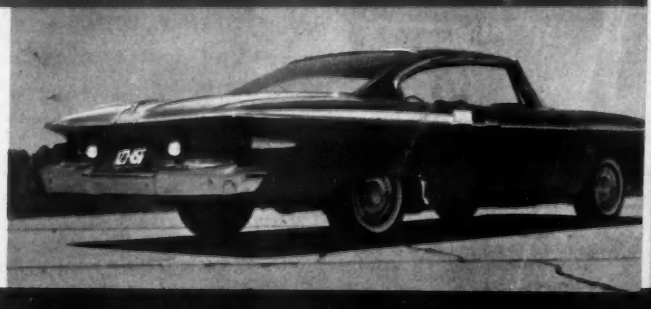
NEW ENGINE FOR THE LARK

OCTOBER 1960 35c

961 CARS . . . . . FIRST COMPLETE REPORTS

. . FORD . . . DART . . . PLYMOUTH . . .

FALCON . . . DODGE . . . COMET . . .



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DETROIT DEMANDS IT! KENDALL HAS IT!

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Today's automotive engines are the most efficient in history. Built into them is the smoothest, quietest flow of power ever offered motorists. But, automotive engineers state that the continued enjoyment of these features *demands* the protection of a motor oil above and beyond all former quality standards.

That is *exactly* what KENDALL SuperB MOTOR OIL offers you . . . increased protection for your greater driving pleasure.

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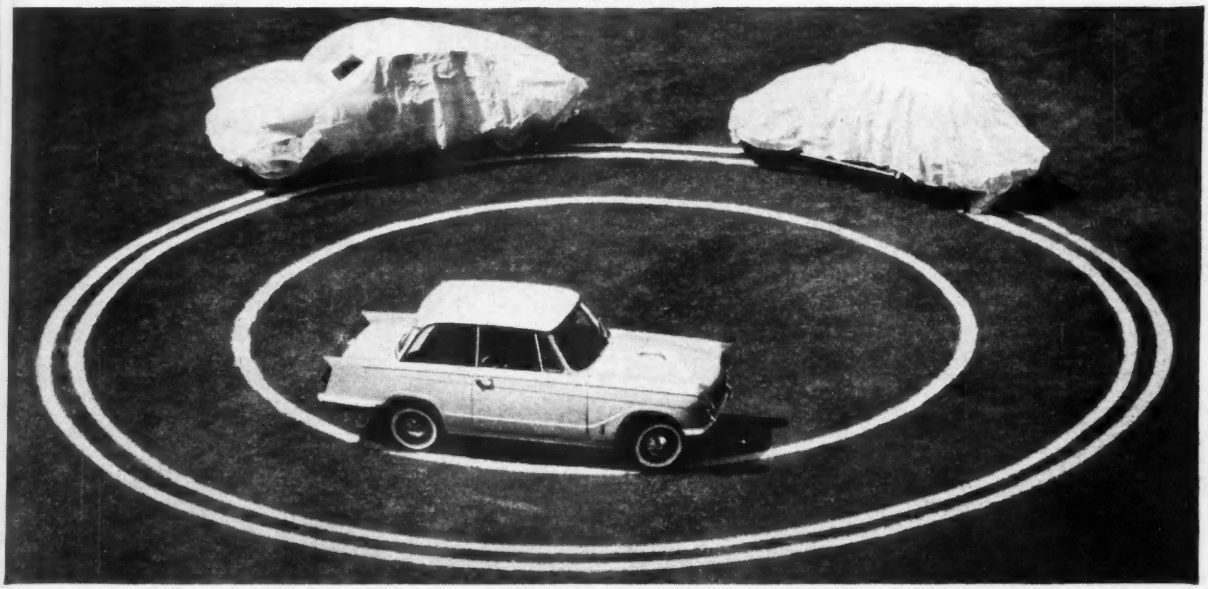
KENDALL
MOTOR OILS

The car inside... a British TRIUMPH Herald



All 3 cars in the picture are smaller cars. A "compact," an "import" and the new British TRIUMPH/Herald. Though the TRIUMPH is no shorter, it can outturn and out-maneuver the other two quite noticeably. Why? Simply because its front wheels turn farther. It parks with only 18 inches leeway and U-turns in 25 feet.

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Try a TRIUMPH/Herald before you buy any other car. There are 3 models to choose from... Sedan, Sports Coupe, and Convertible. See your Standard-Triumph dealer now. He's listed in the YellowPages.

TRIUMPH

*Sedan—$1849; Sports Coupe—$2149; Convertible—$2229. Port of Entry, plus state and/or local taxes—slightly higher in West. 700 dealers—coast to coast. Overseas delivery available. Standard-Triumph Motor Co., Inc., Dept. DH-100, 1745 Broadway, N.Y. 19, N.Y.

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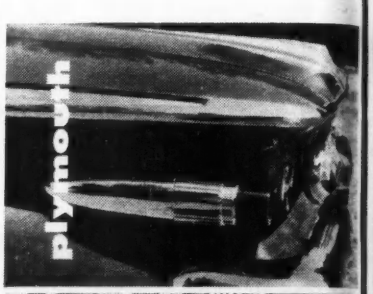

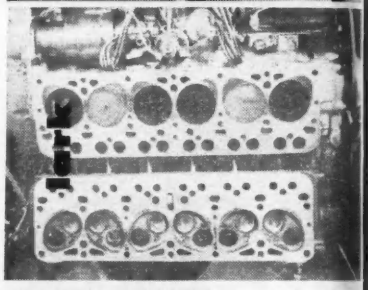

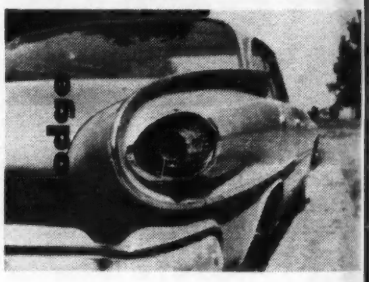

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This month's cover presents first pictures of five of 1961's most important new cars—Dodge, Plymouth, Ford, Falcon and Dart. Full announcement stories on these cars begin on page 22 of this issue.

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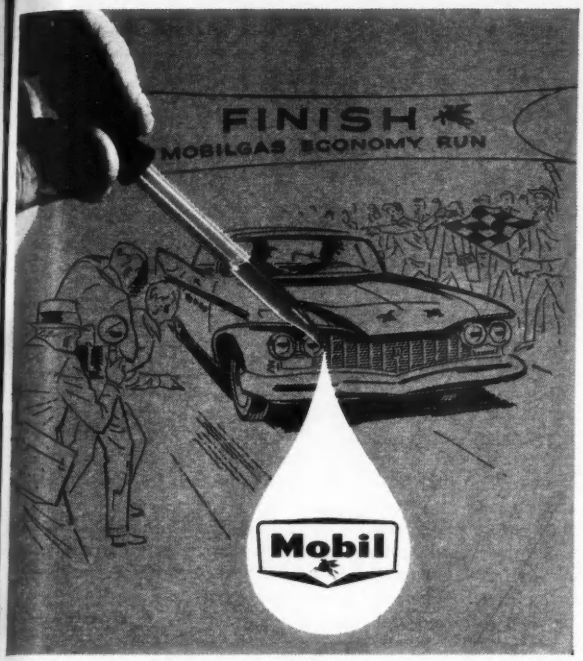
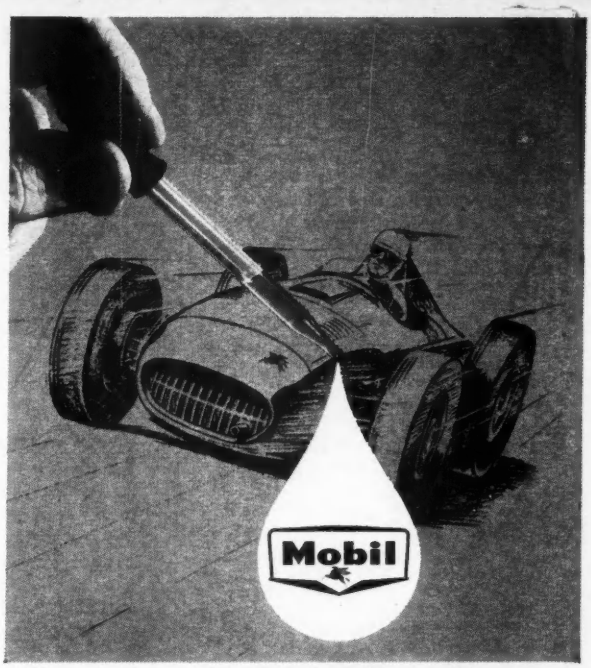
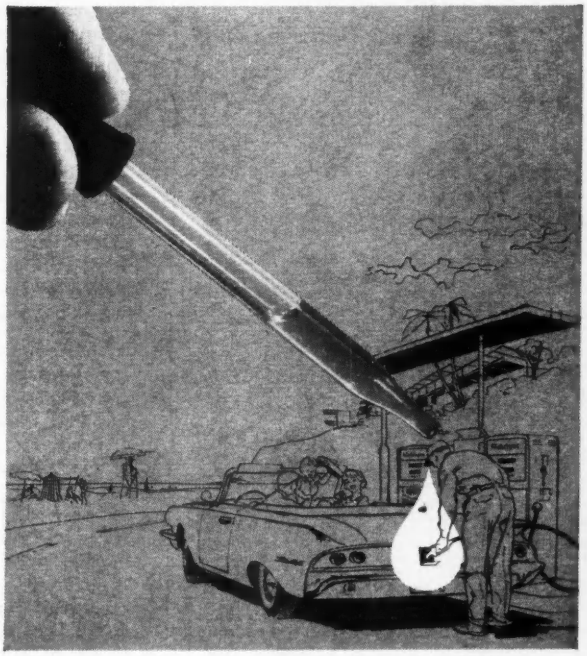


Mobilgas Economy Run cars averaged 21.23 miles per gallon with Mobil



Every drop of Mobil delivered top performance in the Indianapolis 500

New Pikes Peak record proves Mobil packs top power in every drop



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MEMO FROM THE EDITOR

DON WERNER

ONLY A FEW MORE pages need to be turned in this particular issue of MOTOR TREND to find the official start of the 1961 model year. Before we get that far, however, there is just enough time for one last fast look at the 1960 cars. Then they'll be old stuff and history.

After all the countless words printed in MT during the past 12 months on the 1960's, it would seem there should be very little left to say. Yet, on the other hand, at this stage we certainly know more—probably as much as we ever will—about the relative merits of the domestic cars now going out.

One or two cars, as we look back, stand out. During a year of road testing, the MT staff of editors are driving and studying new cars intensively and continuously. And since this activity goes on year in and year out, the editors quite obviously become a rather sophisticated group, one that is not easy to please and unlikely to be influenced by anything other than the real qualities of the cars themselves and their road behavior. In short, it takes an exceptional car to impress them favorably.

It has been a long, long time since I have observed a reaction comparable to that caused by the Monza Corvair. Enthusiastic opinion from one editorial tester or another on a particular car is not uncommon. Indeed, it is such cases we have to guard against and why group testing is so essential. But in the case of the Monza by Corvair the reaction was not only favorable but unanimous!

The Corvair itself, of course, earned a rare honor from MT earlier in the season when it was named Car of the Year for 1960. That annual decision, however, is arrived at chiefly on the basis of engineering progress alone. In the Monza version many of the operational deficiencies were reduced, if not eliminated, and added were qualities of performance, flexibility and finish that won the rare enthusiasm of the entire editorial staff. The MT road test report, you may recall, labeled the car the "poor man's Porsche," and there's no higher compliment than that to be paid to a domestic production vehicle.

* * * * *

I said there were two 1960 cars that deserved to be singled out from all the rest and the other one, appropriately enough, is a standard-sized car, the Dodge and Dart which really should be evaluated as a single design. The sales success of Dodge-Dart has astounded everyone and while this ordinarily is poor evidence of a car's real worth, in this case it may be accepted as recognition by the public for what it is, an outstanding car.

I spent nearly 10,000 miles behind the wheel of various 1960 Dodges. If the car is not the best in its class I've ever driven, it certainly is unsurpassed. The car is not without some design and manufacturing imperfections, but overall it is a magnificent road machine. Many of its characteristics are shared, naturally, by other makes in the Chrysler Corporation line, but in the Dodge and in particular in the Dart, the most has been made of them.

The handling qualities on bends and the stability on straights are terrific. The V-8 engine-automatic transmission combinations are flatly unbeatable in any way you care to measure performance. There are some cars that are as hot and some that can squeeze out as many mpg, but none that can do both as well, unless it be the nearly-identical Plymouth.

How Dodge-Dart and Corvair will rate in 1961 is an open question. The competition is going to be rough. But these two enter the new model year with a good start from 1960. Let's hope they can keep it up. /MT

Facts MOTOR TREND readers should know about

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FIRST AND ONLY NEVER DRAIN ANTI-FREEZE & SUMMER COOLANT

Contains patented Color Check to watch your cooling system for you!

Is "Telar" really different? Yes. It's the first and only anti-freeze you can *safely* leave in as long as your car's cooling system is mechanically okay.

Aren't there other anti-freezes you don't have to drain? None! Manufacturers of all other anti-freezes and cooling system fluids recommended draining. If you don't drain ordinary anti-freeze, you run the risk of having your cooling system ruined by acid and rust clogging.

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Does "Telar" help in hot-weather driving? "Telar" has a higher boiling point than water. The more "Telar" you add, the higher you raise your boiling point—up to 250°F. in today's pressurized cooling systems. Because it rust-proofs metal surfaces, "Telar" keeps your cooling system clean and free-flowing. This means less chance of boilover during long uphill pulls, standing in traffic, or desert and other hot-weather driving.

How long will "Telar" protect against freezing? "Telar's" anti-freeze protection is flexible. You can protect to any temperature down to 60° below zero. Because it is a concentrate that mixes with any water, you buy as much, or as little, protection as you wish. In hot climate or cold, you can tailor "Telar" protection to fit your needs.

How does Color Check work? If mechanical trouble develops, such as a leaky head gasket, and acid should get into the solution of "Telar", exclusive Color Check changes the solution's color from red to yellow before costly damage results. It is the *only* time you drain and replace "Telar". In Du Pont's five years of car tests, this rarely happened.

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HERE'S A VIEW OF THE "500"....INCLUDING THE ALL-IMPORTANT TIME TRIALS...THAT THE GENERAL PUBLIC NEVER GETS.....

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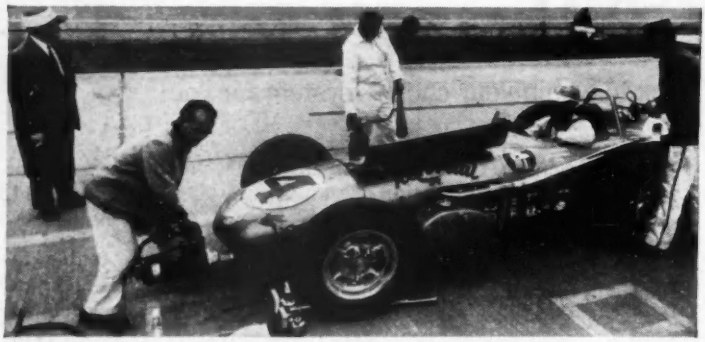
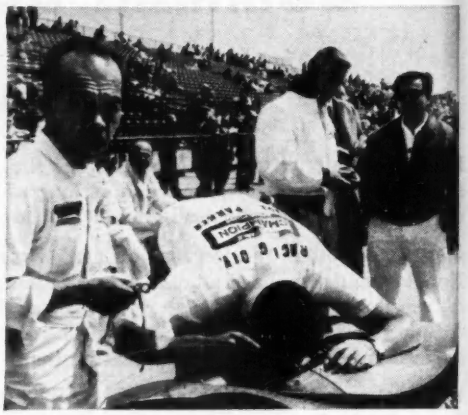
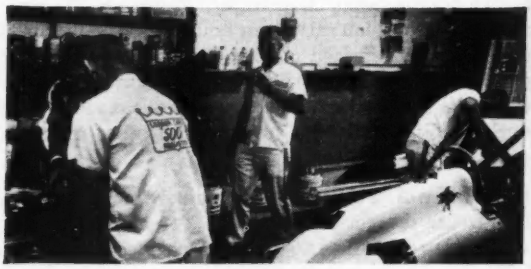


1. OUT ON THE PIT APRON you watch Jim Rathmann's Champion-sparked engine being started for a practice run, two days before time trials. Smoky Yunick, wearing the big black hat, was boss of Rathmann's pit operations during the race. Yunick is also a top mechanic in stock car racing.



2. STANDING BY JIM RATHMANN'S CAR the day before time trials start, you watch as his head mechanic, Chick Hirashima, waits for Champion Racing Engineer Earl Parker to check the plugs after a run. A visit to Indy shows you how much these engine experts rely on spark plug checks to get a better idea of what's going on inside their engines.

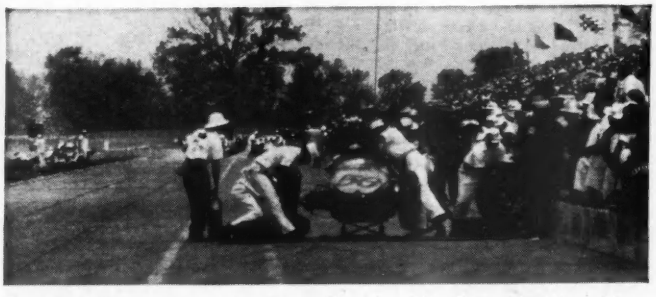
3. ON THE PIT APRON the first day of qualifications you feel like joining the applause for happy Chick Hirashima, running to congratulate Jim Rathmann on breaking track qualification records. For the second straight year, every car that qualified was Champion-sparked.



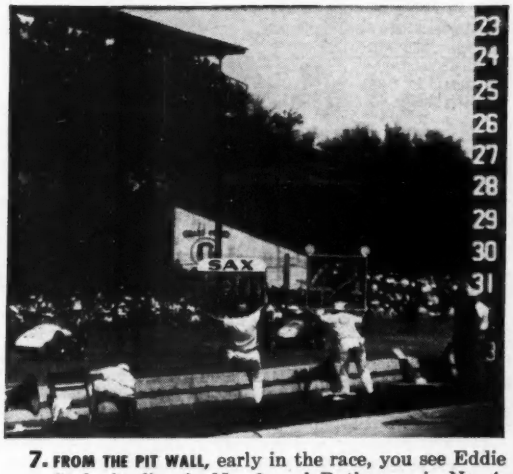
4. INSIDE RODGER WARD'S GARAGE early on race day morning, you see final preparations as Champion Racing Engineer Dick Jones (left) checks plugs with A. J. Watson, ace Indy car builder and head mechanic for Ward and Chuck Stevenson. Car is Ward's.

DEPENDABLE
CHAMPION
SPARK PLUGS

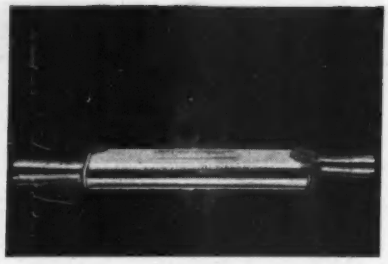
5. FROM THE TOWER you see rare sight as Ward and Rathmann, running 1-2, roar into the pits together on lap 148. In the most exciting duel ever seen at the Brickyard, Ward and Rathmann officially exchanged the lead 15 times in the last 78 laps before Rathmann's victory. Ward finished his pit stop first, waved to Rathmann as he drove out. Rathmann's crew chief at once stopped fueling, sent him in hot pursuit of Ward—and victory. It was the 10th time in the last 11 races that a Champion-sparked car won the "500."



6. FROM DOWN THE PIT APRON you see Rookie-of-the-Year Jim Hurtubise get fast pit service, his car raised on a unique jacking platform. Hurtubise rocked the Speedway with a fantastic 149.601 mph lap during qualifications—and a 4-lap average of 149.056 mph!



7. FROM THE PIT WALL, early in the race, you see Eddie Sachs leading in No. 6, and Rathmann in No. 4, being signaled by their pit crews. Sachs, Rathmann and Ward, the front row starters, all race sports cars as well as the big Indianapolis speedsters.



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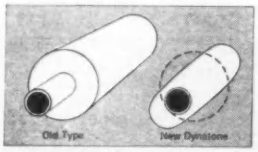
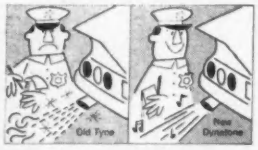


NEW SOUND
No blare to invite a ticket—muted purr says "power" without being offensive.



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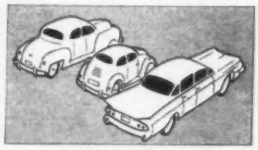

Ask to see the exciting new Dyna-Glas at your favorite automotive chain store today. Also the famous Goerlich original equipment type mufflers—the economical Standard or deluxe Master. Either is the biggest buy for your dollars.

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MYTH OF GAS MILEAGE
Gentlemen:

In regard to your story, "The Myth of Gas Mileage," (August MT), I owned a 1948 Buick Roadmaster for five years, during which time I drove it about 60,000 miles. I kept track of every gallon of gas that ever went into the tank, and the mileage I got. The mileage varied from 8 mpg in winter (I like to warm the engine) to 10½ in summer, depending on the type of driving I was doing at the time. If the mileage dropped below 9 mpg in summer, I corrected it with a tune-up.

I tried every trick of tuning that I could read about, think up, or get from friends or mechanics—but I could never improve mileage. Still, it was possible by driving very carefully, mileage-wise (coasting up to stop signs, passing cars without speeding up by planning ahead, accelerating gently from stops, etc.), to go west out of Zion on Highway 173 for 20-30 miles and then back in to Zion, and get 14 mpg. I did this at least three times a year for five years.

Now you tell me that driving habits don't affect mileage much. Maybe not 30 per cent, but somewhat more than you get in your article.

Robert DePew — Zion, Ill.

Sirs:

Enjoyed your article, "The Myth of Gas Mileage." You are right insofar as the experiment goes. But you are in the same rut Detroit is—you proved *your* point but stopped your research where further results might have been good for the average.

How well would the Economy Run driver do with the same conditions and the same car (no special tune-up)? If he does better—what did he do that I could do to increase my poor mileage?

Bob Barkhouse — Meridian, Calif.

Dear Sir:

Anyone in your position shouldn't expect any driver with any experience and intelligence at all to accept such a bunch of useless facts (?) and opinions. Can you, honestly, hold up your head and say poor driving habits do not affect gas mileage?

You pass off quick acceleration and sudden stops as "irrelevant" because they are illegal." Brother! I'll settle for a small per cent of the many dollars in wasted gas each hot-rodder loses per year by such illegal acts.

Let's say Driver A and Driver F in your article drive 15,000 miles next year. Do you want to flip for the difference in their gas bill?

Donald W. Beckelhimer — Mulvane, Kan.

ONE EXPLANATION
Dear Sirs:

In "Classic Comments" in the August issue, Robert Gottlieb wanted to know why certain parts (clutch, gears) go bad after storage. I think I have the answer to the gear problem.

I learned this about a year ago while owning a Karmann-Ghia. The VW factory does not recommend the use of hypoid gear oil in VW steering boxes. The reason is that it is quite corrosive.

Years ago, when the hypoid gears first came out, it was discovered that they meshed so well that the gear teeth wiped all the oil off the face of the gears. Metal-to-metal contact soon wore the gears out. Hypoid oil was developed and made corrosive so that a thin film of oxidation was formed when the gears meshed. Then, just the oxidation wore off.

Because Mr. Gottlieb's car was sitting inactive, the gears couldn't clean off the oxidation. It probably went deeper into the metal, making it brittle. A little strain on the gears and—voilá!

Whether modern gears would do the same, I don't know. It would seem a good idea to drain both rear end and transmission and flush them before storing.

Porsche, by the way, recommends hypoid oil in their steering boxes.

R. Harrison — Vicksburg, Miss.

TAKE 'EM OFF!
Dear Sir:

So the compacts are too slow and their headlights are deceptive.

The experts howl that speed is a killer . . . so let's take all the compacts off the highways so everybody can speed up and kill himself. Let's take off all the motorcycles. Their headlights look like one-eyed cars. Take off all the trucks. You can't tell them from buses. Take off the buses. They look like trucks. Any car might become one-eyed while on the highway and look like a motorcycle . . . so what the h . . .?

Take off ALL the cars, plow up the highways and plant bird seed, and everybody stay home.

Zack T. Barnard — Fort Payne, Ala.

A MILE OFF!
Dear Sirs:

In Mr. Berman's letter about buying Chevrolets (July MOTOR TREND), he stated that his 1957 Chevy had a V-8 with 183 cubic inches and his '60 model had a V-8 with 230 cubic inches. I believe something is wrong, as the smallest V-8 Chevy offers is a 283-cubic-inch.

I imagine what he meant to say was that his '57 Chevy had 283 inches instead of 183, and his '60 Chevy had 230 *horses* instead of 230 *inches*.

The whole letter was a mile off course. If you can buy a new Impala from a dealer for $2675, I'll eat the thing! The price would seem closer to $3675 than his figure.

Billy Lee — Mt. Olive, Miss.

FINAL SALES FIGURES
Dear Sirs:

With great interest I look forward to the car sales figures at the end of each year. To tell the truth, my curiosity is killing me as to what the car sales figures were for 1959!

Richard Thies — Omaha, Neb.

Here is the list of the top ten finishers in the '59 sales race:

1. Ford	*1,352,112*
2. Chevrolet	*1,349,557*
3. Rambler	*401,446*
4. Plymouth	*393,213*
5. Pontiac	*388,856*
6. Oldsmobile	*366,305*
7. Buick	*232,579*
8. Dodge	*192,798*
9. Mercury	*156,765*
10. Studebaker	*153,823*

MY LAST V-8!

Dear Sir:

Three cheers to Bill Taylor and MOTOR TREND for telling both sides of the story on six-cylinder engines (August MT)! This type of semi-technical article makes excellent reading for the armchair car enthusiast like myself.

I am now driving my first and last V8-powered car.

Ben Togske

PLYMOUTH PARTS

Dear Sir:

I possess a 1933 Plymouth coupe, which I'm trying to restore to its original condition. But this isn't an easy task—parts for such an automobile are scarce.

Do you know where I could obtain parts?

Eugene Egger Redwood City, Calif.

The Plymouth Four-Cylinders Owners Club will be able to provide leads on where to obtain such parts. For further information write to Jay M. Fisher, 765 Valley St., Orange, N.J.

WORKING MAN'S CAR

Dear Sir:

We believe we have the perfect "working man's" car—the 28-hp Fiat 600 for $1300.

The capacity seems unlimited—it will carry a regular-size wheelbarrow or four bales of straw or five passengers, or our weekly shopping load, plus two adults.

The cost is still under one cent per mile. This includes gas, oil, lubrication, plugs, points and anti-freeze!

Winter traction also seems unlimited. A nice combination of flat bottom, rear engine over driving wheels, four-speed gearbox and 5½-inch tires takes me where I want to go—where others either cannot or give up trying. The narrow-gauge wheels seem to go through rough ice and snow where others fail—and with no snow tires or chains. Winter starts are fine and the heater is more than sufficient. Even the windshield washers work on the coldest days.

A few standard items few know about are: vacuum spark advance, full-flow oil filter, directional signal blinker and audio signal, hand throttle, high-beam signal light, map light, hood lock, exterior exhaust system, standard spark plugs, bonded brake lining, LARGE doors and terrific visibility and maneuverability. The gas gauge is the cleverest: as the supply diminishes a blinking red light goes on, changing to a steady red and then when the gauge registers empty you still have 41 miles of driving before the engine quits.

Put that into your "Compact" pipe and smoke it!

Anton J. Tiller Webster, N. Y.

Dear Sir:

After reading your article on the Fiat

continued

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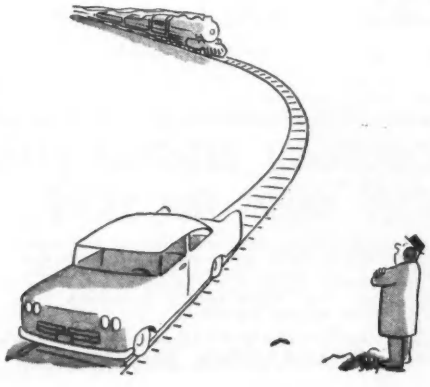

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Letters

continued

2100 in a recent issue of MOTOR TREND, I took delivery of a Fiat 2100 sedan.

After 560 miles I took off for Boston, Mass. from Inverness, Fla. I was gone three weeks and covered 3184 miles. Gas consumption was 120.4 gallons, or an average of 26.44 mpg. This mileage was at turnpike driving speeds—no attempt was made to set a record for economy.

I had no trouble at all with the car, and it was a pleasure to drive. I averaged about 700 miles a day and was not at all tired. I am well pleased with the car.

If only our American manufacturers would put some of the workmanship in our cars, it would help sales.

Frederic L. Walker Inverness, Fla.

"FOLKSIE VOLKSIE"

Dear Sir:

There is a rumor in the winds to the effect that the Volkswagen is about to undergo a major metamorphosis. We who like the "folksie" Volksie can see no reasonable use in changing the "bug" except perhaps synchronizing first gear and, perhaps, reworking the external skin.

Weldon W. Shous, Jr. Atlanta, Ga.

ONE BAD FEATURE

Gentlemen:

As a former Corvette owner, I was very interested in your road test of the '60 model in the July issue. Small points in the car are refined every year, and it is always interesting to read what has been done with the latest version.

One point, however, that has been sorely neglected is the wind buffeting that occurs at highway speeds. You mention this only briefly in your report and, to my way of thinking, it is one of the most serious problems the car has.

The beauty of a Corvette is its road behavior at a good, fast clip. It has the performance and handling to cover ground faster than anything else I've ever driven. Yet, at its best speeds, the driver is constantly distracted by the wind pounding away at the left side of his face. The only way he can avoid it is to roll up the window and cut off his best source of ventilation. Over a long distance, such a thing adds quite a bit to driver fatigue.

What is most annoying is that the buffeting is the result of non-functional design, namely the wrap-around windshield. If a conventional windshield, together with windwings, were used on the Corvette, it would be just as good as any other car with the windows open.

It is disappointing that a car of such otherwise functional engineering and which has been refined in so many important ways over the years should retain a very poor feature with no virtue but the appearance it gives the car. And even that is debatable.

William J. Kennedy Moses Lake, Wash.

SOLD ON COMPACTS

Dear Sirs:

In my opinion, all this to-do about the new compacts has a lot behind it. I think the boys in Detroit are finally coming around to giving the public what it wants. The big cars are fine, I'll grant you, but

I believe the compacts have it all over them.

I am the proud owner of a '59 Ford Galaxie. As far as I'm concerned, it leaves nothing to be desired, except for the fact that it's just too darn long! Recently I took a demonstration ride in a Comet and I was really sold on it. It has the same clean styling as my Galaxie and it has a sensible size.

Like I said, I'm perfectly happy with my Ford, but I plan on trading it in on a Comet this fall.

Gary E. Wichas Escanaba, Mich.

NO CHANGES FOR INDY CARS

Gentlemen:

I was very interested in Charles Nerpel's story in your August issue, covering the 44th running of the Indianapolis "500." I would, however, like to correct a statement that was made by Mr. Nerpel in the last paragraph of the article.

On May 29, 1960, at a meeting of the National Championship Car Owners Association, the members overwhelmingly went on record as opposing any change in engine displacement on Championship race cars for the 1963-'64 racing season.

In addition, last winter at a meeting in Los Angeles of the Engine and Chassis Specification Committee of the United States Auto Club, the question of engine reduction was discussed, with the National Championship Car Owners Association going on record in opposition to such a move.

We would also like to go on record as expressing our appreciation of your publication's support of what we consider the finest sport in the world.

T. H. Hollingsworth, Executive Secretary
National Championship Car Owners Assn.

THE MAD AND THE BEAUTIFUL

Gentlemen:

The designs of the model compact customs in your August issue, in my opinion, are the worst examples of customizing I have ever seen. To take two extremely well styled cars and turn them into piles of chrome, flames, mirrors, and fake grilles seems to be in the worst of taste.

These designs insult the compact buyer's taste. Why not try displaying a well customized compact to agree with the sensible tastes of a compact owner?

Roger Guernsey Indianapolis, Ind.

IMPORT HIT PARADE

Dear Sirs:

Which foreign cars, sold in the United States in 1959, placed in the top ten?

Edward G. Cragg Philadelphia, Pa.

1) Volkswagen—119,899; 2) Renault—90,536; 3) English Fords—42,413; 4) Opel—39,320; 5) Fiat—38,139; 6) Simca—35,111; 7) Hillman—27,835; 8) Triumph 22,922; 9) Vauxhall—22,683; 10) Volvo—18,468.

"ECONOMY" COMPACTS—HA!

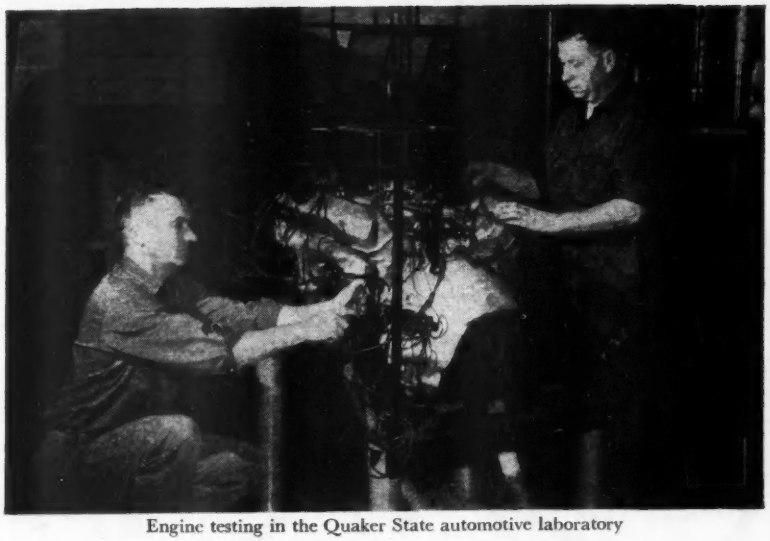
Dear Sir:

Since there is so much talk of small cars and compacts, I would like to get in my two cents' worth.

The cheap economy compacts—ha! ha! The cost of a compact—that is, Corvair, Falcon, Valiant—in Glace Bay is about $2800, and the price of gasoline here is 52 cents a gallon. You think by buying

continued

no guesswork about Quaker State Motor Oil



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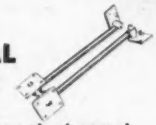

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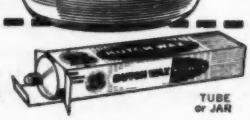

TUBE or JAR

Letters

continued

one you will save money and get economy —I should say not!

But don't get me wrong—I have nothing against the compacts. They are what was needed to wake Detroit up.

We own a Ford Consul, one of the best of the imports. The cost of the car was $2290 with heater, dual sun visors, padded dash, leather upholstery and other features. The car can seat six adults, without squeezing. Its mileage is around 28-30 mpg. It is one of the top sellers here, along with the VW, Morris Oxford and Vauxhall.

I am glad to see Pontiac coming out with the "Tempest." I think it will be a great car in performance, economy, handling etc. and will soon rank with the top-selling imports.

Barry Smith — Glace Bay, Nova Scotia

ELECTRIC CARS

Dear Sirs:

Is there much future for electric cars? The chief drawbacks are that they have a short driving range and a limited speed.

Is it possible to recharge the batteries while the car is operating? Could one or two extra batteries be carried just to run a generator and recharge the main set?

Is it possible to use wind power, either to help propel the car or use it to operate a generator?

I was recently in Italy where gasoline is 80 cents a gallon. Are any electric cars being produced in Europe?

J. B. Arnolfo — Millbrae, Calif.

The future for electrically driven automobiles lies in a smaller, lighter source of electricity than now provided by lead-acid batteries.

It is possible to recharge the battery while the car is operating by the use of a smaller gasoline-driven generator. As horsepower is directly convertible into kilowatts, or electrical energy, using the forward motion of the car to recharge the battery, it is not very practical because you never get as much recharge back as is required to drive the car forward.

As for wind power—there are some four-wheel sailboats that show up occasionally on the dry lakes, but this is not very practical, except for fun. It would probably take more horsepower to push a car fast enough to operate a wind-driven generator than such a generator could ever produce.

Outside of electric golf carts and a few experimental cars, we know of no mass-produced electric automobiles.

DETERGENT OR NON-DETERGENT?

Dear Sir:

Perhaps you can set me straight on the value of detergent oils. I have just purchased a 1957 Mercury Monterey. Since I have no way of knowing the type of oil used by the previous owner, would you advise the use of a detergent oil or non-detergent?

I have heard arguments for and against detergent oils and have been told that I should never use a detergent oil in an old engine, because it will cause the car to start using oil.

Ralph F. Dewberry Jr. — Galveston, Tex.

Since the 1957 Mercury does not have

continued on page 16

MG

This Little Bomb Started the Revolution...

The excitement started with the classic TC. And MG still leads the pack with the new 1600. New, bigger engine for flashing speed. Disc brakes up front to stop on a slippery dime. Unbeatable, ungimmicked design that says pure sports machine. Take one out for a spin and see for yourself...why the new MGA 1600 is the world's most popular sports car. A modest $2485, West Coast port of entry.

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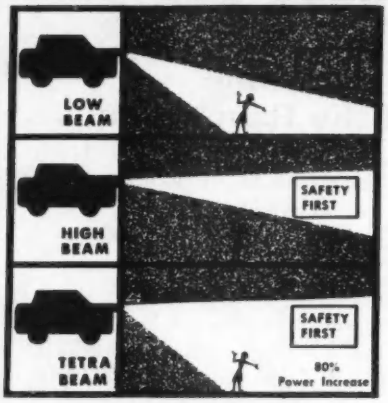

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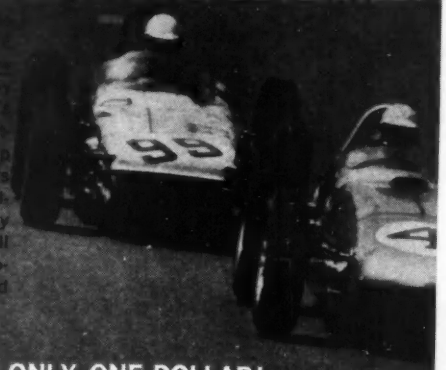

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Letters

continued

hydraulic valve lifters, it is not necessary to use detergent oil. Oils of this type were designed primarily to keep the closely fitted valve tolerances of hydraulic lifters free of oil-deposited gums and varnish.

ETHYL OR REGULAR?

Sirs:

I have a running argument with my father about whether we should use regular or ethyl gas in our car. We have a 1957 Chevrolet with a V-8 engine and dual carbs. The engine is 170 horsepower, single exhaust.

Which do you think should be used—regular or ethyl?

Rick Flynn Castro Valley, Calif.

If you are willing to retard the spark slightly and give away a little speed and acceleration, your Chevrolet V-8 will run quite well on regular grades of gas as manufactured by the big oil companies. An occasional high-speed trip will help keep the carbon from the combustion chambers, reducing the tendency of the engine to ping.

ATTENTION—CORVAIR OWNERS

Dear Sirs:

Since the introduction of the Chevrolet Corvair there has been a group of owners who like the car—different!

Now we have a club—the Corvair International Club, or the CIC. Requirements: Corvair owner, lover or admirer. Anyone interested in joining may contact me for further details.

To show you that your decision was right in calling it "the car of the year," I personally have put 50,000 miles on my Corvair, the engine has never been touched (only for tune-ups) and the original belt is still on. It's a great car!

Louis Moore 2856 Emogene St. Mobile, Ala.

DUAL EXHAUSTS FOR VALIANTS

Gentlemen:

You report and carry advertisements of dual exhaust systems available for a Corvair, but I have seen none such for a Valiant Do you have any information as to any being available, and, if so, the results to be expected?

H. D. Hailey Seattle, Wash.

The stock Valiant exhaust system is excellent as it is. However, any custom muffler shop will be glad to split the exhaust manifold and install dual pipes. With stock mufflers it is doubtful that you would notice much difference in the way of performance.

TIP FOR VALIANT OWNERS

Sirs:

Here is a tip for Valiant owners: For added strength, beauty and mainly protection, I have attached 1960 Ford Anglia bumperettes to the highly vulnerable rear end of my car. No modification is necessary.

John F. Freeman Garden City, N.Y.

PREREQUISITE—MONEY

Dear Sirs:

Each year as the new models bow in, they are subjected to the praise and criticisms of readers who consider themselves

experts in the field of design. It often appears that these readers could have done a better job themselves.

I believe the reason for this criticism is a real lack of stylists with a love for cars. Those who are truly gifted are too often outnumbered by the nuts who insist on adding fins, chrome and winking lights.

It seems that the prime requisite now to becoming a stylist is money! Look at the tuition prices at the Art Center and at Pratt Institute! As for scholarships, Art Center offers them after the second year in school. Where does the needy student get money for the first two years?

To my knowledge, General Motors is the only company that attempts to help the aspiring young stylists financially through their Fisher Body Craftsman's Guild. Chrysler has even done away with their Draftsman's Training Program.

Detroit had better wake up and provide some help for the talented but financially needy young people before it's too late. Disgusted

PROUD POSSESSOR

Gentlemen:

I'm the proud owner of a new '60 Corvair Monza Coupe, a real plush car inside and out, with perfect handling, wonderful on gas and a dream to drive. (I've previously owned a Chevy, Olds 98, Buick and a 3800-pound Ford convertible.)

I'll take a compact any day when they can drive and handle like my Corvair. I just sit back in my seat in traffic and look up at all those tired-out drivers in those "monsters."

Gerald Gdula — Auburn, N.Y.

HERE WE GO AGAIN!

Dear Sir:

With new models due to be introduced soon, we will again see a display of poor workmanship and sloppy assembly. Many car owners will have the aggravation of repeated expense and loss of valuable time in having numerous factory-built defects repaired after the new-car guarantee is up.

The sad part about all this is that many car owners do not have the guts to complain long enough and strong enough to the car dealers and the car makers to get satisfactory adjustments and repairs to their cars. Many people give up too soon and wind up having to pay for repairs themselves when the car dealer should have taken care of it.

The main reason for much of the aggravation is that many of the cars made during the first few months of production every model year have many flaws and built-in defects. This is due to the manufacturers' mad rush to get new models on the market regardless of the poor workmanship and sloppy assembly. Only by repeatedly keeping after the car makers can buyers get what is rightfully theirs in a new car.

R. Blagden — East Hampton, Conn.

SHOW THEM THE WAY

Dear Sir:

Leave it to Studebaker-Packard and Rambler to make automobiles right. They should build training centers and teach the Big Three how to make cars.

I know—we own a '60 Lark. The Falcon, the Corvair or the Valiant cannot compare with it. The Lark combines "go with show," good looks, economy and roominess.

Eugene C. Rose — Johnstown, Pa.

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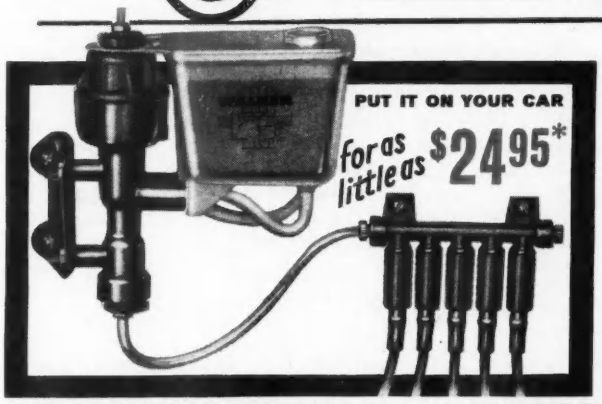

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NEW, fool-proof, fully-automatic Walker Lubrication System precisely meters and injects right amount of oil into every lube point on your car *at the start of each trip.*

Thoroughly tested and proved . . . fits *all* makes and models with standard fittings . . . all parts fully guaranteed.

Check number of chassis lube points on your car

MAKE & YEAR	STD. TRANS. Man. Steer.	STD. TRANS. Pwr. Steer.	AUTO. TRANS. Man. Steer.	AUTO. TRANS. Pwr. Steer.
Buick 59-60	16	16	15	15
Chev. 58-60	10	11	9	10
Ford 57-59	14	12	11	9
Ford 60	12	10	11	9
Olds. 59-60	17	17	17	17
Pont. 58-60	13	13	13	13
Ply. 57-60	10	10	8	8
T'Brd. 55-60	14	12	11	9

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INDIVIDUAL FLOW CONTROL—Calibrated injectors meter precise volume and maintain constant pressure to each fitting.

FULLY AUTOMATIC—Oil pressure activates lubricator pump . . . all fittings automatically lubricated at the start of every trip.

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ECONOMICAL—Priced for every car owner . . . prevents costly repairs due to improper lubrication . . . "pays for itself." Enjoy this NEW convenience and worry-free driving ease and comfort . . .

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NO. OF FITTINGS	COMPLETE KIT PRICE
5 or 6	$24.95
7	26.95
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Name_____

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MOTOR TRENDS

OLDSMOBILE READIES A NEW HOT MODEL

A luxury convertible called the "Skyrocket" is being prepared for the 1961 season. It will have leather bucket seats and other luxury appointments, but even more important is a special engine package consisting of three two-throat carburetors (the old '57 J-2 setup), hot camshaft and dual exhausts. Horsepower rating should be near 350. This engine may be optional on other '61 Olds lines in keeping with Detroit's general trend back to high performance.

POWER-KIT FALCON REACHES 110 MPH

Behind the well-guarded gates of Ford's Romeo, Michigan proving grounds a hopped-up Falcon has been performing new tricks to the delight of the Ford engineers. With such modifications as a hot cam and dual carburetion the Dearborn compact has reached 110 mph turning 7000 rpm. It appears that the Falcon camp is not going to let the Valiants, Tempests, etc. take the compact performance crowns without a real fight.

PONTIAC WINS RACES WITH "ECONOMY" OPTIONS

In big-time stock car racing, equipment or modifications are legal if the factory files notices with its dealers, regardless of whether the equipment was installed at the factory. So Pontiac approves dealer-performed "economy operations" such as porting cylinder heads, polishing combustion chambers, installing 14-to-1 Forged-true pistons, opening up bearing clearances, etc. The result of these modifications plus the normal optional power equipment: up to 400 hp on the stock car tracks.

TURBO SUPERCHARGERS— GM COMPACT EXPERIMENT

Classified as one of Detroit's "top secrets" is current work at General Motors with a newly developed small turbo supercharger. Results of tests have been excellent and announcement of the unit as an option for either the Buick Special or Olds F-85 compacts is expected within the coming year.

ALUMINUM BUMPERS NOW POSSIBLE

A new manufacturing process developed by Reynolds Aluminum allows bumpers and other auto parts to be formed from the lighter metal with low cost and little time. It is rumored that one 1961 car will be equipped with aluminum bumpers on all of its air-conditioned models (to offset the extra weight of the cooling equipment). Many other car makers are expected to take advantage of the process in 1962.

DUAL EXHAUSTS ON WAY OUT?

Less than 10 per cent of all 1960 cars were ordered with dual exhaust systems. The units have been dropping in popularity since a peak in 1956 when close to 40 per cent of the new cars were so equipped. Most observers blame the drop on high replacement costs.

The impressive new building taking shape on the riverfront in downtown Detroit is Cobo Hall, home of the 43rd National Automobile Show. The big event, which begins October 15, will feature every new U.S. car. Next month's issue of MOTOR TREND *will be a giant Auto Show edition, honoring the event with more pages and news than ever before published by MT.*

CONVERTIBLE COMPACTS SCARCE ITEM IN 1961

By the end of the announcement season Detroit's compacts will be available in an abundance of every body style but the popular soft top. Corvair in particular was expected to announce a convertible version this year but development was slowed down. The only new fresh air version will come from American Motors in the form of their newly restyled American. First reports indicate that it is a very good looking little car.

FLOOR SHIFTS RETURN TO STANDARD SIZED CARS

More than a few eyebrows were raised last announcement season when two of the new compacts showed up with floor-mounted manual gear shifts. There are even greater surprises in store this year for at least one of the larger makes will unveil such a "new" feature. These are not high-performance cars where the floor shift is considered an asset.

CROSS-COUNTRY TESTS RECEIVE NEW EMPHASIS

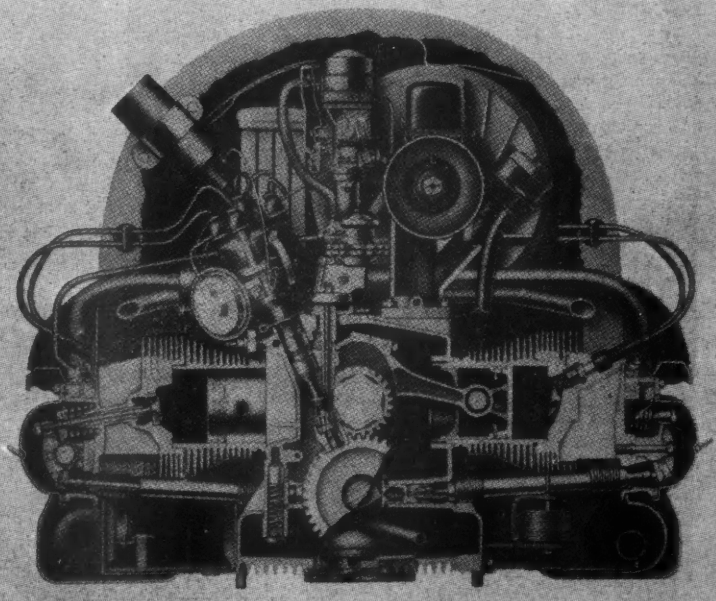
As in no other year U.S. car makers are placing great stress on testing their new cars out on the highways before the announcement times. They now realize that the "bugs" that pop up in everyday driving just don't appear on the test tracks. Many MT readers have spotted the test cars across the country and sent reports on their findings. One fact that they don't realize: In many of the cars are MOTOR TREND staff observers who are already in the process of testing the new vehicles.

SIX CYLINDERS COME TO LIFE

The Sixes have risen again. Sales of six-cylinder powerplants have come up from all-time lows in the late 1950's to an amazing share of the market somewhere between 40 and 50 per cent this year.

SMOKE SCREEN OVER ULTRA COMPACTS

Detroit is bursting with a rash of rumors, denials and iffy statements concerning the Big Three's plans for small-small cars. The situation is so comparable to the confusion that surrounded the debut of the compacts a year ago that many in the industry are sure the cars are going to be announced very soon.



THE VOLKSWAGEN CHANGES IN 1961

THE NEW VW HAS been announced and, like other such events of the past few years, the big news is the fact that the car remains basically the same in appearance and design. Beneath the body shell, however, are important changes, particularly in the areas of the engine and transmission.

The powerplant (drawing, above) has been increased to 40 hp at 3900 rpm, as compared to 36 hp at 3700 rpm in 1960. Compression has been lifted from 6.6 to 7.0-to-1, and, in addition, there are larger valves with stronger valve springs, a new camshaft and rotating cam followers. Maximum torque is now 61 lbs.-ft. instead of the previous 56. Basically this is the same engine that has powered the VW buses and trucks in recent months, so its components have been well tested.

The new Solex carburetor has an automatic choke, and a counterweighted flap valve in the air intake directs warm air to it at low throttle openings to prevent icing.

The redesigned transmission features synchromeshing for all four speeds. It is in a new one-piece magnesium die-casting. Overall gear ratios are lower and promise better acceleration and hill climbing.

The fuel tank has been reshaped to double the front luggage space capacity and the tank vent opens to the outside eliminating gaseous odor in the compartment.

Rumors of a big change for the popular Volkswagen have been frequent and false for the last few years. They are with us again and strong reports indicate that a new VW with a 1.4- to 1.6-liter engine will be announced within the coming year. But the 1961 changes and modifications are important enough to indicate that, if a new model is unveiled, it will be offered *in addition* to the VW sedan as we know it.

. . . yesterday's dream car is transformed into sparkling reality. And what an **exciting** *reality . . . with sleek lines of burnished beauty sculptured by the wind . . . with full throttle response an effortless flow of uninterrupted power . . . SUDDENLY IT'S 1961! No, this isn't a fantasy, you'll be reading it next month in MOTOR TREND'S Big Detroit Issue. This issue features a* **complete** *line up of* **all** *the new 1961 models . . . with car-by-car specifications on each model. If you've wondered about those 1961 dream cars, don't miss "the big one," the NOVEMBER ISSUE OF MOTOR TREND. It's a gasser!*

If it's automotive news or photo features, you'll read it *first* in MOTOR TREND MAGAZINE

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A gasoline can only be as good as the refinery that makes it. That's why new Flying A 100+ is the top-performing gasoline of the day. The most advanced refinery in the world makes Flying A. Completely modern equipment, electronic controls, more efficient refining methods are used to bring you this higher-octane gasoline at a lower price.

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FLYING A GASOLINE

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ford
PLACES ITS '61 HOPES

THE 1961 FORD looks different and is different. Beneath its new sheet metal, grafted on a variation of last year's structure, there are important developments in maintenance, performance and general convenience. It is perhaps one of the most changed "facelifts" ever offered by the Ford Division.

The most startling innovation is a longer lubrication interval. No specific mileage figure has been revealed but, under normal circumstances, the company claims many original owners of

MOTOR TREND October

The 1961 Ford marks a return to conservative styling with completely new sheet metal from the belt line down. Especially interesting is the rear-end treatment, which revives round taillights and canted fins from the past.

IN NEW CONVENIENCES AND OPERATING ECONOMY

1961 models will never have to worry about a grease job. Assuming a trade-in after two or three years of average driving, this implies a minimum of 20,000 to 30,000 miles!

At the factory, the chassis lube points are filled with a special grease having a molybdenum-disulphide base. This has an exceptional affinity for metal; even if it is deliberately wiped off, enough of a film will remain to prevent any metal-to-metal contact. It is an expensive compound but, because it will have to be replenished so seldom, it will cost little in the long run.

To take full advantage of the grease's special properties, the lube points are sealed against contamination with polyurethane caps and liners. Grease fittings have been eliminated in favor of threaded plugs which can be replaced temporarily with fittings when lubrication is required. The efficiency of the system depends on the durability of the seals which, in turn, is affected by different driving conditions. Hence, the company's reluctance to name a definite mileage interval for all times and places.

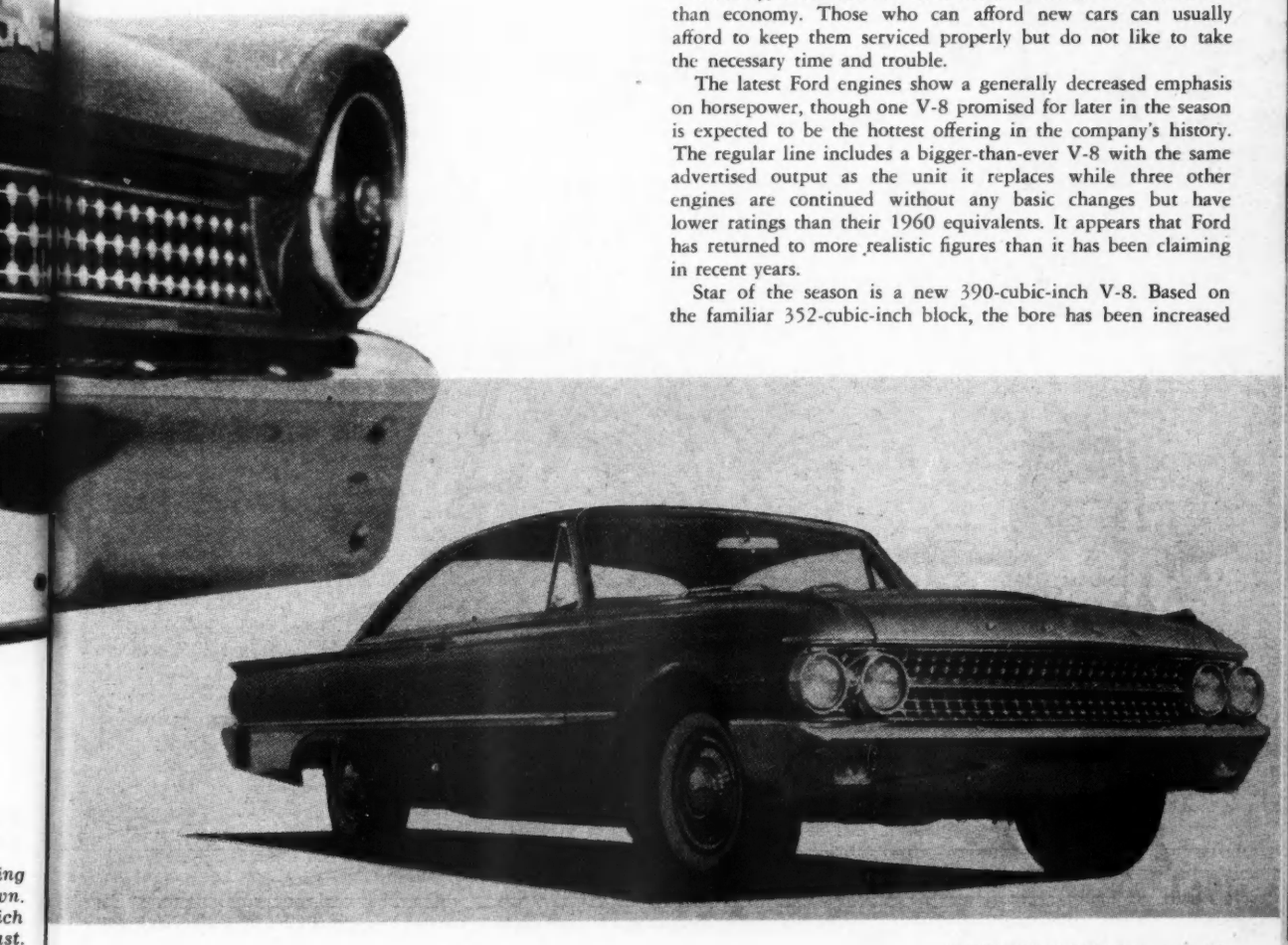
Generally, the arrangement is similar to the Thompson system used by Borgward and Mercedes with the important exception of the removable plugs. Lube points on the two German makes have to be replaced eventually while those on the Ford can be refilled.

Other new features that will reduce maintenance include self-adjusting brakes that take up any necessary slack whenever the car is reversed and vacuum throttle valve controls on the Cruiseomatic transmission to eliminate periodic adjustments of shift timing and smoothness. And Ford continues to recommend a 4000-mile interval between oil changes, twice the distance usually quoted.

Actually, these details mean more in terms of convenience than economy. Those who can afford new cars can usually afford to keep them serviced properly but do not like to take the necessary time and trouble.

The latest Ford engines show a generally decreased emphasis on horsepower, though one V-8 promised for later in the season is expected to be the hottest offering in the company's history. The regular line includes a bigger-than-ever V-8 with the same advertised output as the unit it replaces while three other engines are continued without any basic changes but have lower ratings than their 1960 equivalents. It appears that Ford has returned to more realistic figures than it has been claiming in recent years.

Star of the season is a new 390-cubic-inch V-8. Based on the familiar 352-cubic-inch block, the bore has been increased



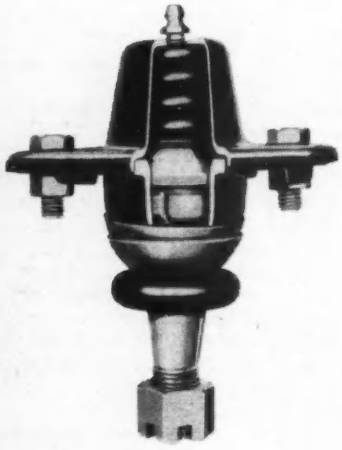
ford

to 4.05 inches and the stroke to 3.78 inches. In standard form, with a four-barrel carburetor and 9.6-to-1 compression ratio, it produces 300 hp at 4600 rpm and 427 pounds-feet of torque at 2800 rpm. Compared with last year's 352 with four-barrel carburetion, which it replaces, the new 390 is rated at the same power but torque has been boosted from 381 pounds-feet, both at the same respective rpm's.

Scheduled for later announcement is a special version of the new engine; it is said to develop 390 hp, a full horsepower per cubic inch! This will replace the 360-hp unit as Ford's super stock and threatens to be a formidable contender for performance honors of the year.

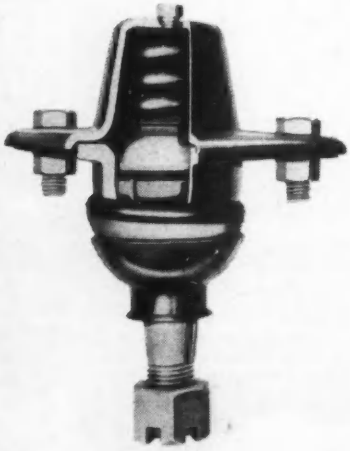
Other Ford engines have reduced power ratings, though no important modifications have been made. The 352-cubic-inch V-8 with two-barrel carburetion and 8.9-to-1 compression now develops 220 hp instead of last year's 235 hp. The 292-

THE NEW FAIRLANE 500 TWO-DOOR SEDAN SHOWS OFF THE CLEAN, CRISP LOOK FOR 1961.



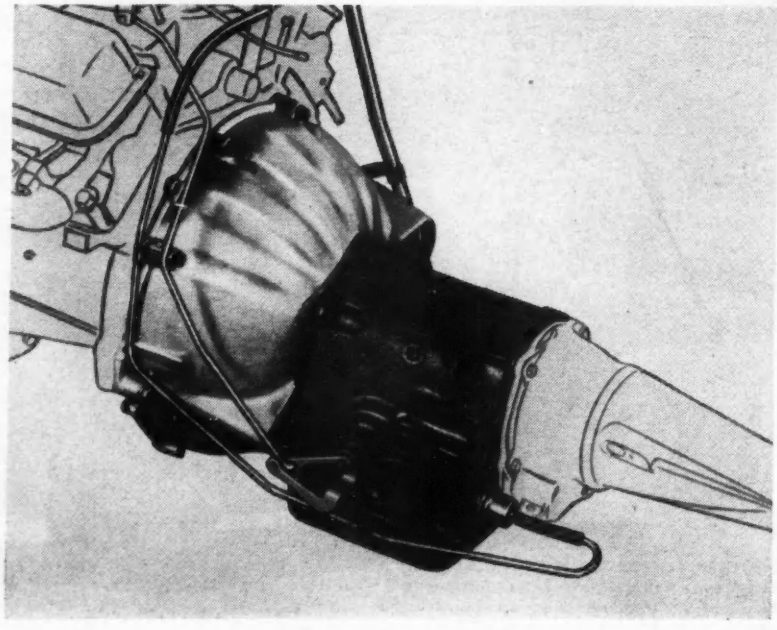
1960

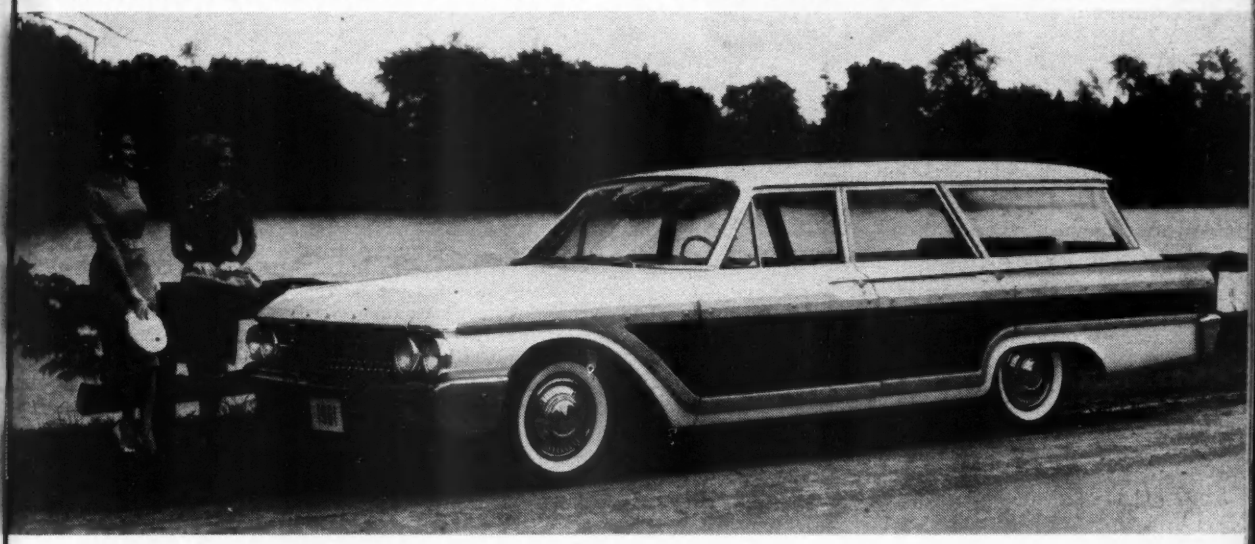
Grease fittings are gone in '61 (left). Sealed lube points, filled at the factory with a special grease having molybdenum-disulphide base, all but eliminate routine maintenance on latest Ford.



1961

Vacuum throttle valve controls are an innovation on this year's Cruiseomatic transmission. They completely replace mechanical shift linkage previously used.





The Sunliner convertible and Country Squire station wagon are still top choices for luxury in the Ford line. Reshaped at the rear, the wagons now feature a roll-down tailgate window.

cubic-inch V-8, which has two-barrel carburetion and 8.8-to-1 compression, has been cut to 175 hp from 185 hp. Finally, the 223-cubic-inch six, equipped with a single-barrel carburetor and an 8.4-to-1 compression ratio, produces 135 hp compared with 145 hp in 1960.

Standard on the 390 and optional on the other engines is a crankcase ventilation system designed to reduce the amount of fumes containing unburned hydrocarbons discharged into the atmosphere. This is an item of particular importance in areas with an air pollution problem and, in fact, will be fitted to all 1961 Fords delivered in smog-conscious California.

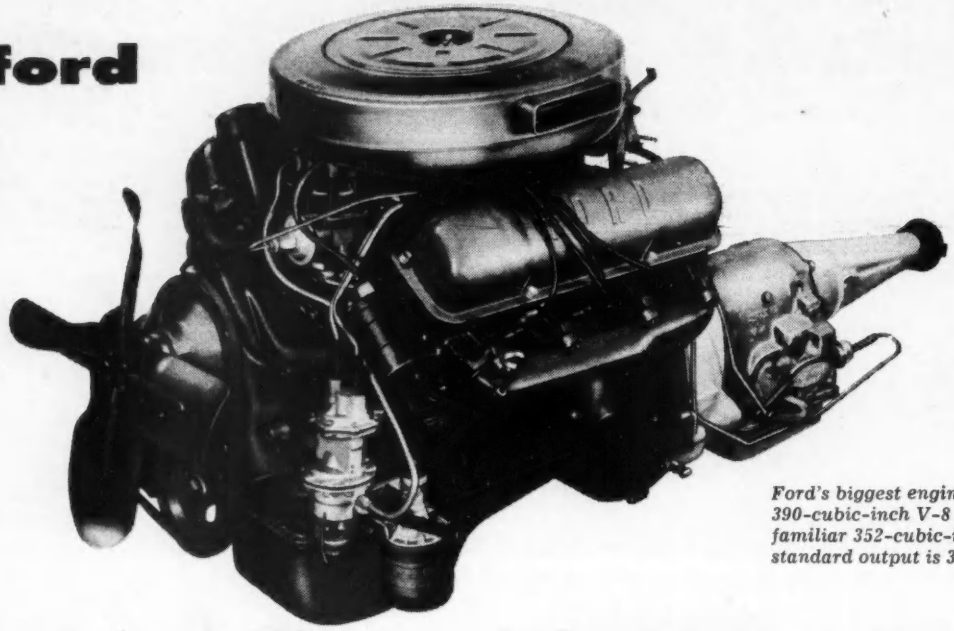
The gases which leak past the piston rings are directed from the crankcase back into the intake manifold, combined with the air-fuel mixture, fed into the combustion chambers and discharged as combustion products through the exhaust system. The rate of flow between the crankcase and manifold is dependent on vacuum. To keep the gases from thinning the mixture at high vacuum, allow a proper flow at low vacuum and prevent reverse flow from the manifold into the case, a special control valve is incorporated into the system.

A minor improvement exclusive to the 390 is an aluminum front cover which reduces weight slightly, minimizes oil leaks and serves as a stronger support for a new higher-capacity vacuum pump supplying power to the windshield wipers.

Transmission choices include manual, overdrive and automatic with any of the four engines. Two automatics are available, two-speed Fordomatic with the Six, 292 V-8 and 352 V-8 and three-speed, dual-range Cruiseomatic with all three V-8's. The new Cruiseomatic, in addition to featuring the vacuum throttle valve controls mentioned above, is about 25 pounds lighter than the 1960 version.

Structurally, the new Ford has a lighter frame but a more rigid body to cut down resonance and vibration. The two components have been "tuned" to balance each other better. Inner channels of the side rails have been lightened for greater frame flexibility and side panels have been reinforced to stiffen the body. In a very broad sense, this can be considered

ford



Ford's biggest engine for 1961 is a 390-cubic-inch V-8 developed from the familiar 352-cubic-inch block. Its standard output is 300 hp at 4600 rpm.

a tentative step to unit construction and, in fact, it grew out of experiments with the Thunderbird and Continental shells. A 1960 Ford was used as a point of reference in the studies, revealing its own minor weaknesses as well as those of the two luxury cars.

Smoother, quieter road behavior is further assured by the use of butyl rubber, known for its damping qualities, in the body mounts.

Some suspension and steering details have been altered for smoother operation. For a softer ride, the semi-elliptic rear springs have thinner main leaves on all body types but two-door sedans and hardtops, the shock absorbers have been recalibrated and a new tire tread is featured. The steering shaft has a flexible coupling to reduce harshness, a higher, easier ratio is used with the manual system, and the power steering unit is now a reaction-limiting type that cuts parking effort up to 50 per cent with no sacrifice of road feel.

The exterior sheet metal is all-new from the belt line down and, while passenger compartment dimensions are the same as in the 1960 model, the car is shorter and narrower overall. The length is 209.9 inches, 3.7 inches less than last year, and the width 79.9 inches, 1.6 inches less. The 119-inch wheelbase and 55-inch height remain the same.

Styling changes include a full-width grille with a concave surface, a higher hood line, more restrained sculpturing of the side panels, a shorter greenhouse on some body styles, canted fins along the top edges of the rear quarters, a shorter deck and, once again revived, circular tail lights. From the rear, the fin and light arrangement shows some resemblance to the 1957 model.

In function as well as appearance, the most important body modifications are at either end of the car. Front-end stability has been improved with reinforcements of the hood and fenders; the hood opening is approximately 11 inches narrower than it was last year, permitting the whole assembly to be more rigid at some sacrifice of engine accessibility.

Reduced overhang at the rear, the primary reason for the car's shorter overall length, has resulted in several important changes. On conventional body styles, the luggage compartment has been rearranged and station wagons have a completely new rear body structure.

Though luggage capacity is about the same as before, a bigger opening and repositioned spare tire have made the compartment easier to use. The deck lid is nearly 10 inches wider, improving access considerably. And the spare tire has been moved forward to the kick-up area just above the rear axle, leaving the rear of the trunk clear of obstructions.

Alterations to the station wagon body are even more extensive. At the rear, the new version is completely different from its predecessor, resembling the Falcon more than last year's Ford. The body has been squared off to provide plenty of cargo space within the shorter length, the tailgate is seven inches wider and, most significantly, the lift gate has been replaced with a roll-down window. For several years, Ford has been the only full-sized wagon to retain the old-fashioned lift gate. Now, finally, it has been eliminated. Operation of the window is by a manual crank in the center of the tailgate on the lower-priced wagons, by an electric switch on the more expensive ones. The electric control is also available as an option on wagons not equipped with it.

Only one significant addition has been made to the Ford accessory list for 1961, a lock-out switch for the power window controls. Based on a device previously introduced by the Lincoln-Mercury Division, it prevents operation of the windows except from the master control by the driver's seat. The purpose is to keep children, for example, from hurting themselves by opening windows accidentally.

A new circuit breaker for the power seat and power window system prevents damage to any components not directly involved in a circuit failure.

For 1961, Ford is offering 16 body styles, one more than last year. The two-door Fairlane business sedan has been dropped but two new choices have been added, a two-door Galaxie hardtop, featuring the familiar Thunderbird roof line and called a Club Victoria, and a four-door, six-passenger Country Squire station wagon, complementing the nine-passenger version. Another change is the cataloguing of the Starliner hardtop, with its distinctive sloping roof, and the Sunliner convertible in the Galaxie series. Previously, they enjoyed a separate status.

The rest of the line remains the same, two- and four-door sedans in all three series, Fairlane, Fairlane 500 and Galaxie, plus a four-door hardtop in the Galaxie; station wagons, in addition to the Country Squires, include two- and four-door, six-passenger Ranch Wagons and four-door, six- and nine-passenger Country Sedans. /MT

The most successful of the new compacts continues into its second year with only a few important changes. Ford's Falcon, which is outselling the Corvair and Valiant by a wide margin, retains the basic design introduced last year with a bigger powerplant as an option and modifications to its suspension and appearance.

Developing 101 hp at 4400 rpm and 156 lbs.-ft. of torque at 2400 rpm, the new engine is an extra-cost item for those who want the advantages of a smaller car without sacrificing normal performance. It is based on the standard Falcon Six but has a .44-inch longer stroke to increase its displacement from 144 to 170 cubic inches. The cylinder proportions thus become 3.50 by 2.94 inches, still significantly oversquare.

The standard unit is essentially the same as it was last year, except that its horsepower rating has been cut from 90 to 85 hp at 4200 rpm. Torque remains 138 lbs.-ft. at 2000 rpm.

continued on next page

falcon

FORD'S COMPACT ENTERS ITS second year WITH A PROVEN PERSONALITY AND A NEW ENGINE OPTION

Highlighted by a new grille, styling changes in the new Falcon are minor. The basic design of both sedans and wagons is the same as that of last year.

falcon

Sharing the same basic block, both engines have minor refinements in common. The front cover is now die-cast aluminum rather than stamped steel, cutting weight and improving sealing. And vertical ribs have been added to the oil pan to strengthen it and minimize any drumming effect.

Several further modifications are found on the hotter version. The crankshaft, connecting rods and pistons all had to be redesigned to obtain the greater displacement, the carburetor, intake system and intake valves have all been enlarged and the distributor has been re-calibrated. Finally, to retain the standard 8.7-to-1 compression ratio, the new pistons have a lower compression height and the cylinder head has a slightly different configuration.

Because its higher power means greater heat, the 170 engine is equipped with a heavier-duty cooling system. Fan diameter has been upped from 14 to 15 inches, the radiator has a denser pattern and, when the 170 is combined with an automatic transmission, the radiator incorporates a heat exchanger to cool the transmission oil.

Manual transmission and rear axle assemblies are also beefed up for the hotter powerplant. Axle ratios, however, are the same as those for the 144 engine, 3.10 with a conventional gearbox and 3.50 with an automatic, the latter replacing the 3.56 offered last year. On station wagons, 3.50 is standard with all engine/transmission combinations.

Ford engineers have also devoted considerable attention to the new Falcon's suspension system. The actual springs, independent coils above the A-arms in front and semi-elliptics in back, are fundamentally the same but spring rates have been lowered for a softer ride.

Actually, this is the outgrowth of another modification rather than a change for its own sake. On the 1960 model, sudden rebound of the front wheels sometimes caused a jarring sensation. Such a problem is particularly acute with unit construction. The suspension members are attached to the body structure itself, not to a separate frame insulated by body mounts, so road shocks have a more immediate effect on passenger comfort.

To minimize harshness, the rebound action has been made slower and smoother. This was accomplished with a threaded metal bushing in the upper A-arms of the front suspension in place of a rubber bushing used in the 1960 model. To obtain the most efficient results with it, the action of the springs themselves had to be slower. Thus, the rates have been decreased slightly, so that the overall effect is softer suspension behavior.

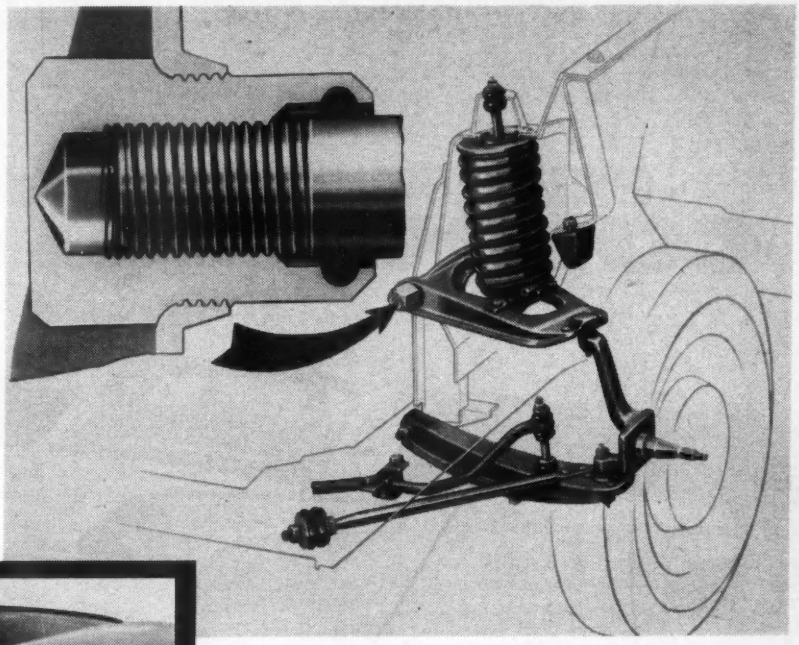
The substitution of a metal bushing for a rubber one could create a need for additional maintenance. Ford has avoided this difficulty by pre-lubricating the new component at the factory.

The actual structure of the car has been carried over from last year without change. It is a light but rugged unit body-and-frame with several practical features, such as bolt-on front fenders for easy replacement and galvanized underbody parts to prevent rust.

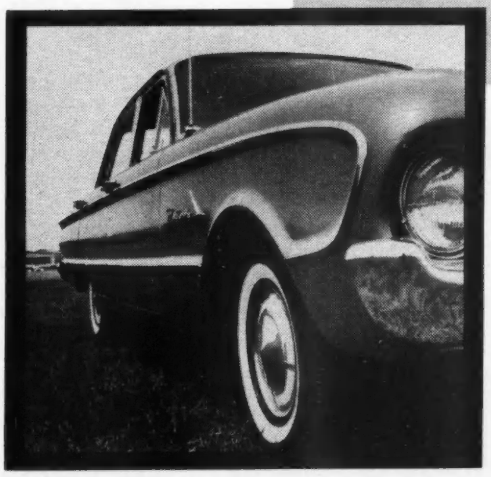
Sheet metal, too, is the same as it was in 1960, though the new model does have its own distinctive trim. The concave grille has been eliminated in favor of a convex one, featuring a finer texture and highlighted by a horizontal crease across the center. The parking lights are still set in the grille just inside the headlights, but have been re-shaped to conform with the new grille design.

Some of the nameplates and emblems are restyled. A Falcon symbol has been added to the trim immediately behind the front wheel well while block letters below the deck lid replace the script previously used to identify the car from the rear. Other trim innovations distinguish Falcons equipped with the deluxe package. Among these are a chrome beading that outlines the sculptured panel along the side and a larger diameter hubcap

Front suspension rebound has been smoothed out with new threaded metal bushings in upper A-arms.



A chrome outline of the sculptured side panel, extending full car length, now comes with deluxe trim kit.



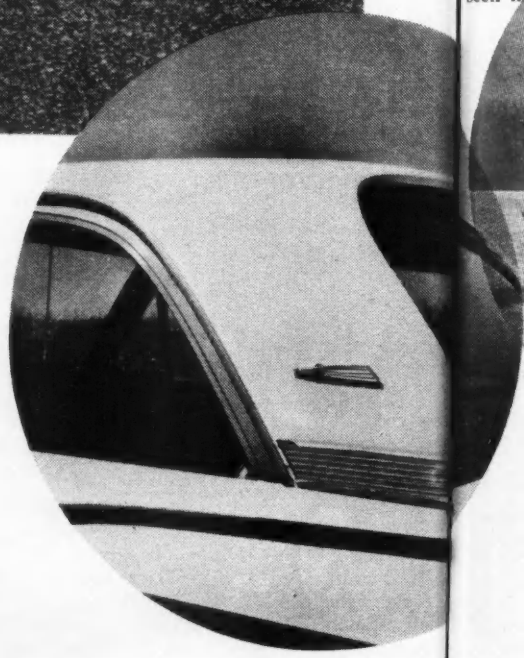
that covers the entire wheel.

A worthwhile change inside the car involves the dome light. In the 1960 model, it was located above the center of the windshield, glaring right in the eyes of front seat occupants and not illuminating the rest of the interior. This year, it has been moved to a conventional position at the center of the ceiling.

Ford continues to offer the Falcon as a two- or four-door sedan, two- or four-door station wagon or Ranchero pickup truck. In overall size, they are the same as their 1960 equivalents. They all share the same chassis specifications, 109.5-inch wheelbase, 55-inch front tread and 54.5-inch rear tread. In overall length, the sedans are 181.2 inches while the wagons are 189 inches. There is only one series but it is available with either standard or deluxe trim. **/MT**

comet

NOT YET A YEAR OLD, THE COMET RETAINS ALL POINTS OF ITS ORIGINAL STYLING.



GREATER POWER and a smoother ride are Comet's major innovations for 1961. The oversized compact from Lincoln-Mercury Division, which made its initial bow just last March, has entered the new season with a bigger, hotter engine as an option and a softer suspension system. Otherwise, the car is much the same as before, with only minor refinements in engineering and appearance.

Displacing 170 cubic inches, the new engine is essentially a stroked version of the standard six-cylinder, 144.3-cubic-inch unit. It develops 101 hp at 4400 rpm and 156 lbs.-ft. of torque at 2400 rpm. It is a supplementary powerplant, not a replacement, and will be available at extra cost in all new Comets, with either a three-speed manual or two-speed automatic transmission.

The standard engine is fundamentally unchanged, though its advertised output has been reduced from 90 hp at 4200 rpm to 85 hp at the same engine speed. Maximum torque continues to be 138 lbs.-ft. at 2000 rpm.

NEEDED NEW POWER JOINS THE SLIGHTLY REFINED BODY OF DEARBORN'S LATEST COMPACT

Both units share certain minor advances, notably a front cover of die-cast aluminum instead of stamped steel and vertical ribbing to reinforce the oil pan. Generally, the two powerplants are the same as their counterparts in the 1961 Falcon line, except that the Comet versions have automatic chokes as regular equipment.

A simple technique was used to obtain a greater displacement in the higher-powered engine. It has the same bore as the regular unit, 3.50 inches, but the stroke has been lengthened from 2.50 inches to 2.94 inches. This was accomplished with a new crankshaft having longer throws, shorter connecting rods and special pistons. To duplicate the standard compression ratio of 8.7-to-1, the pistons have a lower compression height and the cylinder head has been re-shaped slightly. Better breathing is provided with enlargements of the carburetor and intake system while both the carburetor and distributor have been re-calibrated.

Several modifications to the engine accessories and drive train have been dictated by the higher power and torque outputs of the new engine. A larger, 15-inch fan is fitted, the radiator has more fins per inch, the manual transmission has been modified for heavier duty, a special water cooling system is included for the automatic transmission and the rear axle has stronger ring and pinion gears.

The improvement in performance with the 101-hp engine will not be known precisely until a full-scale road test can be conducted. However, Lincoln-Mercury has released some interesting estimates related to everyday driving situations. The cars involved are described as having manual transmissions and 3.56 axle ratios. Pulling around and passing another car that is travelling 50 mph is said to take 13 seconds with a regular Comet but just 11.7 seconds with the higher-powered version, an improvement of 11 per cent. Accelerating from 35 mph to 60 mph, as when entering a fast lane of traffic, takes 11.9 seconds with the standard car but only 8.7 seconds with the faster one, a 27 per cent better figure. It should be emphasized that these are factory claims, not independent test results.

Another significant mechanical change is to be found in the suspension system. During the few months it has been in existence, the Comet sedan has become known for its riding qualities, which are considered better than those of normal compacts. The principal reason, of course, is that it has a 114-inch wheelbase, a good six inches longer than other cars in its class. The springs themselves are quite conventional,

New trim features on the 1961 Comet include an emblem on the roof quarter panel, restyled grille texture with a flatter surface and Thunderbird-like chevrons on front fenders.

consisting of coils mounted above the A-arms at the front and semi-elliptics with an asymmetrical mounting for the axle at the rear.

This year, a pre-lubricated, threaded metal bushing has been installed in each upper A-arm of the front suspension, replacing the rubber bushing previously used. The purpose of this feature is to eliminate sudden rebound and the consequent harshness transmitted to the passengers. It provides a slower action which, in turn, has made it necessary to lower the spring rates. The total result is a smoother, quieter ride.

Structurally, the new Comet is unchanged. The unit body-and-frame, which was originally adapted from the Falcon's, has the same frame members and the same sheet metal as before. Corrosion, a particular problem with unitized automobiles, is minimized with zinc coating on underbody parts.

As far as appearance is concerned, it will take a sharp eye

The Comet wagon is more truly a compact than the sedan. Sharing the Falcon body shell, it has a wheelbase of 109.5 inches and measures 191.8 inches in overall length.

to tell the new Comet from its predecessor. The grille has a different texture, with a one-piece aluminum casting that incorporates five rows of horizontal bars arranged in a flat plane instead of the vertical bars and double-concave surface used last year. A more subtle change at the front is a slightly farther forward mounting of the dual headlights. Several minor bits of trim have been added, including three chevron-like strips ahead of each front wheel well and script nameplates on the hood and rear quarter panels.

The sedan has still further changes which, because of the shape of the body, are not found on the station wagon. These include a Comet emblem on the roof quarter and a full-width chrome panel across the rear, just above the bumper. This panel includes a nameplate in place of the block letters used last year. On the deck lid, there is a new handle with an integral lock.

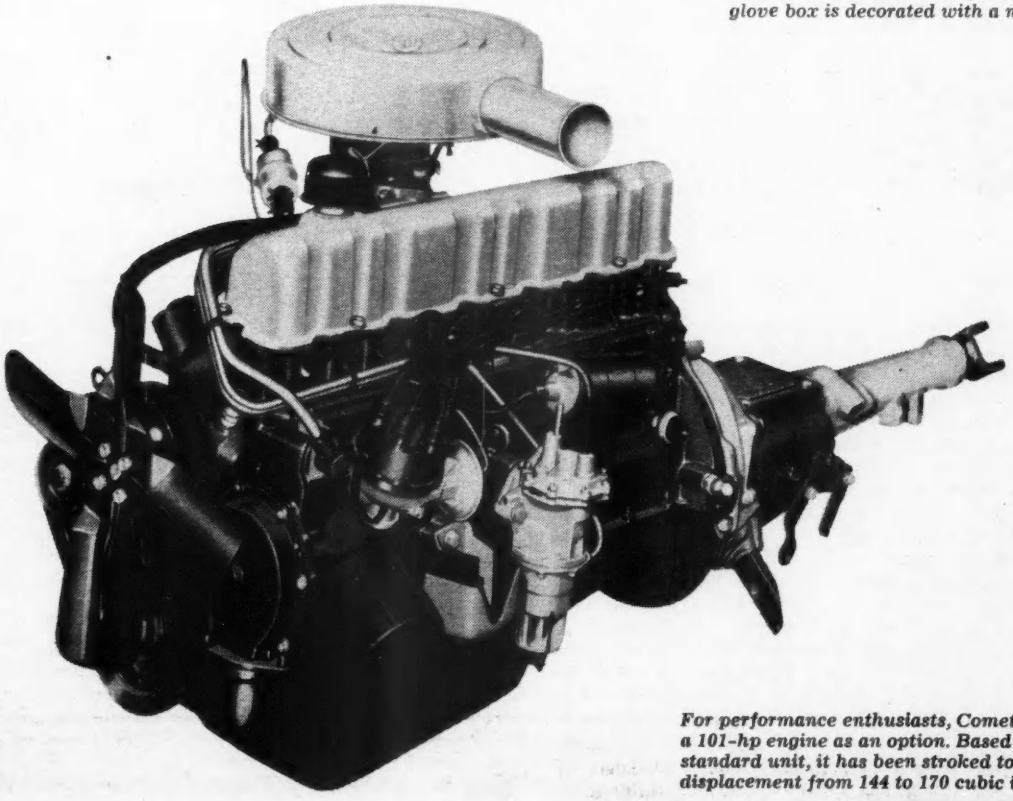
Inside the car, new standard and optional trim fabrics are offered to harmonize with a new selection of exterior colors. The glove compartment is decorated with a Comet emblem and is available with a lock as part of the optional trim package. The only other interior change is the placement of the dome light near the center of the ceiling, instead of just above the windshield.

The choice of body styles remains two- and four-door sedans and two- and four-door station wagons, all with either standard or deluxe trim. The sedans have a 114-inch wheelbase and 194.8-inch length while the station wagons are similar to the Falcon in size, with a 109.5-inch wheelbase and a 191.8-inch length.

Overall, the Comet story for the coming year is little more than a variation on the theme for 1960. Such a development is hardly a surprise, considering the basic design has been in production for less than a year. The existing styling has been credited with an important share of the car's success, minimum tooling costs provide savings that can be passed on to the customer, continued manufacture of the same car will assure high standards of quality and conversion for 1961 production has been accomplished quickly.

Lincoln-Mercury has come up with a winner, judging from public reaction to the original Comet, and intends to stick with it awhile. /MT

The interior, like the rest of the car, has few changes for 1961. The dome light has been moved to the center of the roof and the glove box is decorated with a new emblem.



For performance enthusiasts, Comet now offers a 101-hp engine as an option. Based on the standard unit, it has been stroked to increase displacement from 144 to 170 cubic inches.

plymouth

BREAKS TRADITION WITH AN ENTIRELY NEW SLANT ON STYLING

LAST YEAR WAS A PERIOD of major engineering changes at Plymouth when new engines, unit construction and other innovations were introduced. This year, however, the emphasis is on styling and the line has completely and dramatically changed its overall appearance. The 1961 engineering developments are mostly refinements.

Strangely enough Plymouth, which for several seasons has been sporting some of the most prominent fins of any automobile, has chosen to eliminate appendages of any sort. The 1961 model is based on straight lines supplemented by sculptured curves.

When unit construction was introduced on Chrysler Corporation cars last year, critics were quick to observe that this method of manufacture would undoubtedly impose serious limitations on the stylists. Styling, these pessimists gloomily predicted, would be in a state of suspended animation and unit-constructed cars would go year to year a la Volkswagen with few, if any, changes at all. Plymouth's 1961 styling, however, has debunked this rumor. Even though the car has the same basic structure as last year, no one will ever mistake the 1961 Plymouth for any of its predecessors.

The Plymouth model line-up is unchanged from last year, and the same selection of body styles is offered with 26 models available. Standard passenger cars will be called Savoy, Belvedere and Fury; and station wagons will be the Deluxe, Custom and Sport Suburbans. The six-cylinder engine, originally available only in Savoy and Belvedere models, was extended to the Fury series during the 1960 model year and is again available for all series in 1961. The only Plymouths with a V-8 as a standard powerplant this year will be the convertible and the Sport Suburban station wagon. The body style breakdown is: Savoy: two-door and four-door sedan; Belvedere: two- an four-door sedan and two-door hardtop; Fury: four-door seda two- and four-door hardtop, convertible; Deluxe Suburba six-passenger, two- and four-door station wagons; Custom Sub urban: six- and nine-passenger, four-door station wagons; a Sport Suburban: six- and nine-passenger, four-door stati wagons.

Inside, the new Plymouth has a re-styled, but not extensive changed, instrument cluster. One of the minor changes is th switch to rectangular buttons for the transmission control This has been done since last year—some owners complaine that their fingers were just too big for the buttons.

In the instrument cluster is an apparent holdover from la year, the speedometer. Externally this unit looks unchanged, thermometer-type with bars that rise as each five miles in spee is increased. But the mechanism is different from that use last year.

Plymouth has a new, magnetic right angle drive for i speedometer, replacing the previous geared system. The ne speedometer consists essentially of a cable-driven, 12-pol annular ceramic magnet with temperature compensation, a flu collector, a drum-type indicator with a stationary non-metalli

continued on page

plymouth

bearing, an eddy current disc rigidly attached to the indicator drum and a calibration device.

The mechanism operates as a magnetic torque drive. As the magnet is rotated, the flux lines are attracted to the flux collector passing through the eddy current disc. The eddy current disc is made of electrolytic aluminum because of its specialized electromagnetic properties. Eddy currents set up in the disc produce a torque, whose magnitude is dependent upon the speed of rotation of the magnet. The torque turns the indicator drum of the speedometer. A hair spring on the opposite end of the drum provides a restoring force, maintaining the drum in equilibrium once the spring has been deflected sufficiently to allow the drum to correctly indicate the car speed.

Magnetic flux density and the electrical conductivity of the eddy current disc are variable according to the temperature. Plymouth's engineers have compensated for this exactly as an automatic range regulates the heat in its oven. Two different metals (which expand at different rates) control the air gap between the magnet and flux collector. Thus errors in the indicator due to variations in the magnet flux density and the electrical conductivity of the eddy current disc are automatically corrected.

Plymouth will continue to use unit construction in which the body and frame are integrated into a single, unified structure and welded together. This was one of the car's major engineering advances last year and more precise manufacturing methods have been developed to refine the system. Plymouth is also continuing to decrease the noise level. This year under-hood silencing on cars equipped with factory undercoating has been improved. They have under-hood silencing pads, which are held in place by large-diameter snap-in fasteners. The hood reinforcing webs are bonded to the outer panel with a plastic material that serves as a sound damper.

Aside from the extensive styling change, this year Plymouth's engineering changes are for the most part a honing and refinement of some components. The engine line-up for 1961, however, is almost identical to last year.

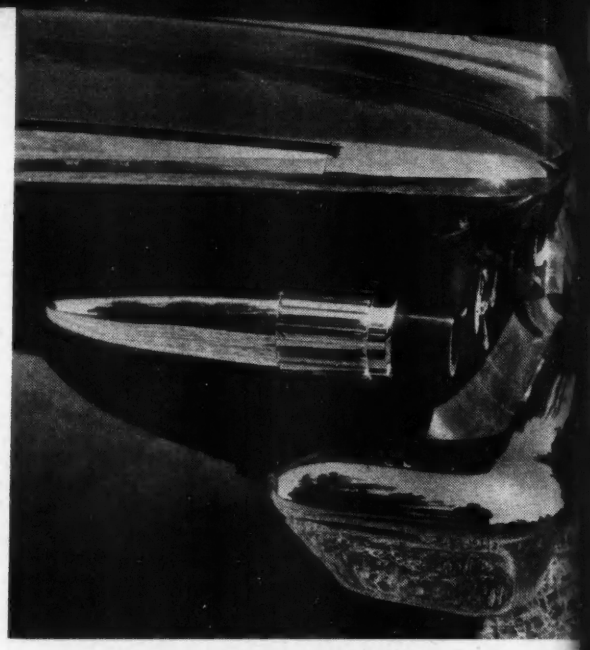
Plymouth started the 1960 model season with four separate engines and two power options. This year the four engines are back but one option has been dropped, the ram induction version of the 361-cubic-inch engine. During the model year Chrysler Corporation standardized the ram induction option for only the 383-cubic-inch engine and Plymouth now offers this version. This is the only change in fundamental engine options.

The slanting six-cylinder is still the major economy engine this year and it has been modified for better performance on low octane fuel. This change is made by increasing the height of the cylinder block by .025-inch which reduced the compression ratio from 8.5 to 8.2-to-1. One engine development on the Slant Six that is a little surprising considering all the predictions made this year, is a switch from aluminum to cast iron for the intake manifold.

Plymouth's economy V-8 will be the Fury V-800 which is a two-barrel carburetor version of the 318-cubic-inch engine. Another returnee from last year is the four-barrel carburetor version of this engine.

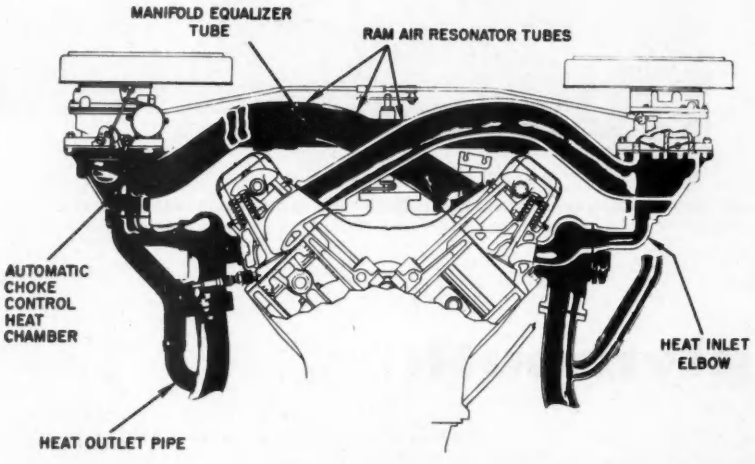
The 361-cubic-inch Golden Commando engine also has a lower compression ratio this year, 9.0-to-1, which was achieved by reducing the piston head height by .025-inch. This is the same compression ratio as that of the 318-cubic-inch Fury V-800. However, the distributor advance characteristics and modified valve timing of the Golden Commando engine require that premium fuel be used.

For performance enthusiasts the 383-cubic-inch engine will again offer ram induction. This dual four-barrel option is definitely for the individual who wants punch performance

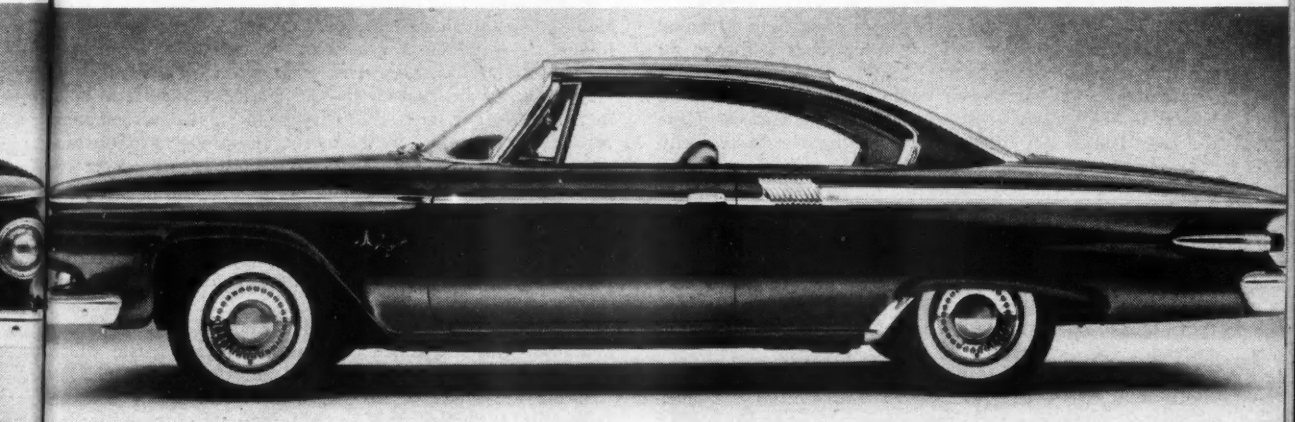


Plymouth's appearance has changed more than any other Chrysler Corporation car. Although styling is completely different, mechanical developments are mostly refinements.

Plymouth station wagons carry out the theme of the new styling but retain their utility features.



Ram induction is Plymouth's most powerful engine. Powerplant is unchanged from 1960 model.



This year Plymouth will have 26 different models, seven engines and five transmissions. All models except the convertible and nine-passenger station wagons will be available with the slanting six-cylinder engine. All powerplants are basically unchanged from last year but the electrical system has new features which replace long-familiar components.

ENGINE COMPARTMENT IS UNCLUTTERED AND MOST PARTS ARE IN READILY ACCESSIBLE LOCATIONS FOR EASY SERVICING.

plymouth

characteristics in his car, but Plymouth engineers seem to be more interested in their economy engines this year.

There are few major engineering changes on Plymouth's engine for 1961. Mostly the developments have been a refining of the present components and in a few cases a change for better economy or operation.

For instance the slanting-six engine has an anti-percolation feature in the carburetor to insure quicker hot starts. There is a new choke, a new heat valve and changed carburetor calibration for better low-speed performance.

There is an improved carburetor on all V-8 engines, too. A new two-stage, step-up jet gives smoother part-throttle performance and finer mixture control. All float needles are tipped with high-grade synthetic rubber to help eliminate flooding caused by dirt clogging the carburetor.

Improved engine breathing for better performance has been provided on the 361-cubic-inch Golden Commando V-8 by increasing the diameter of the intake valves.

A new heavy-duty manual transmission is standard equipment on all 361- and 383-cubic-inch V-8's and all 318-cubic-inch V-8's with power pack. This new transmission has a much higher torque capacity and uses ratios of 2.55 and 1.49 with a reverse ratio of 3.34.

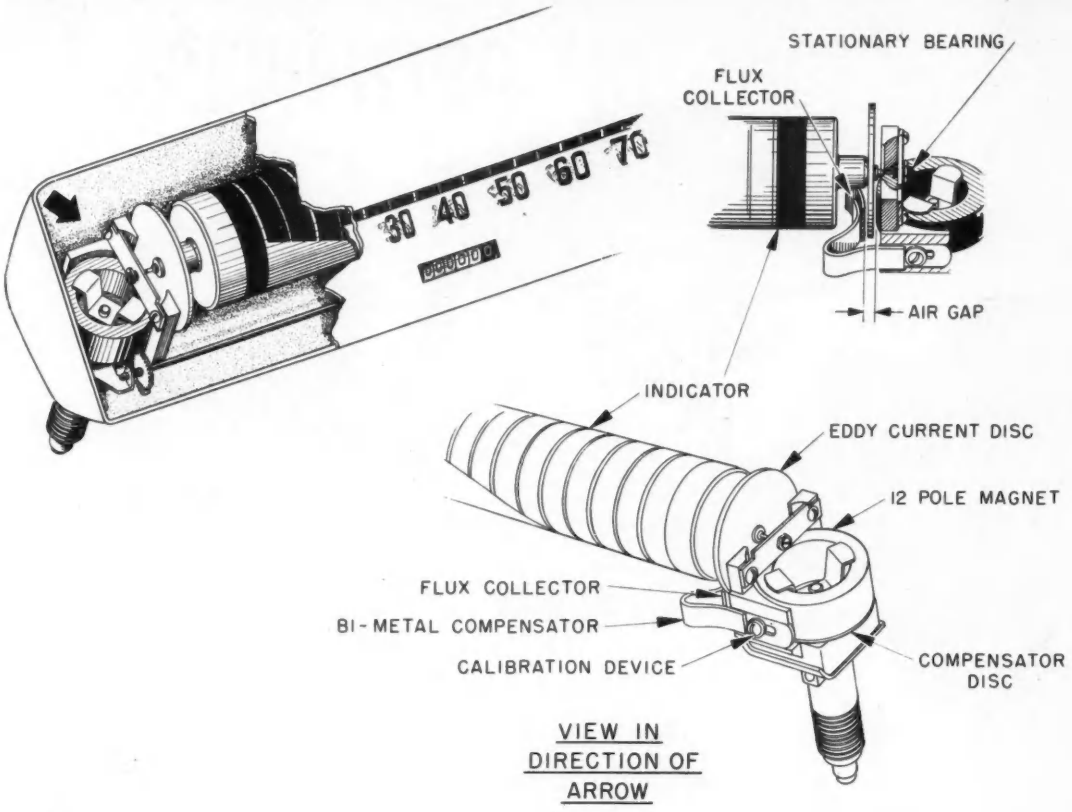
For the 318-cubic-inch engine there is a new lightweight manual transmission. There has also been a change in the manual transmission for the slanting six, featuring an increase in the low-gear ratio from 2.50 to 2.71.

The electrical system has several changes also. The alternator, first introduced on the Valiant, has replaced the long familiar DC generator. Solenoid shift starters, which were only used on Chrysler's most expensive cars, are now being used. And new distributors, built by Chrysler Corporation and formerly used only on six-cylinder engines, are standard equipment. They feature cast-aluminum housings and lightweight nylon breaker point follower blocks that resist bouncing at high speeds.

Other under-the-hood improvements have been made in both manual and power steering. A fabric-reinforced rubber coupling between the steering gear and shaft on manual steering cars acts as a universal joint and helps smooth out the effort required to drive. On power steering cars equipped with the 361- and 383-cubic-inch engines an ingenious mounting arrangement eliminates the need for adjusting drive belt tension. This is an arrangement which causes the entire power steering unit to swing outward, tightening the belt for better efficiency when power steering is used.

One other change on the 1961 Plymouth is rather unconventional. This is a closed crankcase ventilating system which will be installed on all cars intended for sale in California.

The closed system replaces the conventional system used on other cars. It consists of a special carburetor, a spring-loaded valve and a flexible tube connecting the valve and carburetor. The carburetor has a special calibration and contains a fitting just below the throttle blades into which the crankcase vapors are drawn by the suction in the intake manifold. /MT



At first glance the speedometer seems to be the same unit that was formerly used. But a new magnetic drive operates more quietly by eliminating much metal-to-metal contact.

Although Plymouth's exterior is changed extensively, the body shell is the same basic design as last year; the trunk is comparable in capacity and convenience.

Square steering wheels are still an option for Plymouth owners. The record player, lower right, is still another extra for Chrysler Corporation cars.

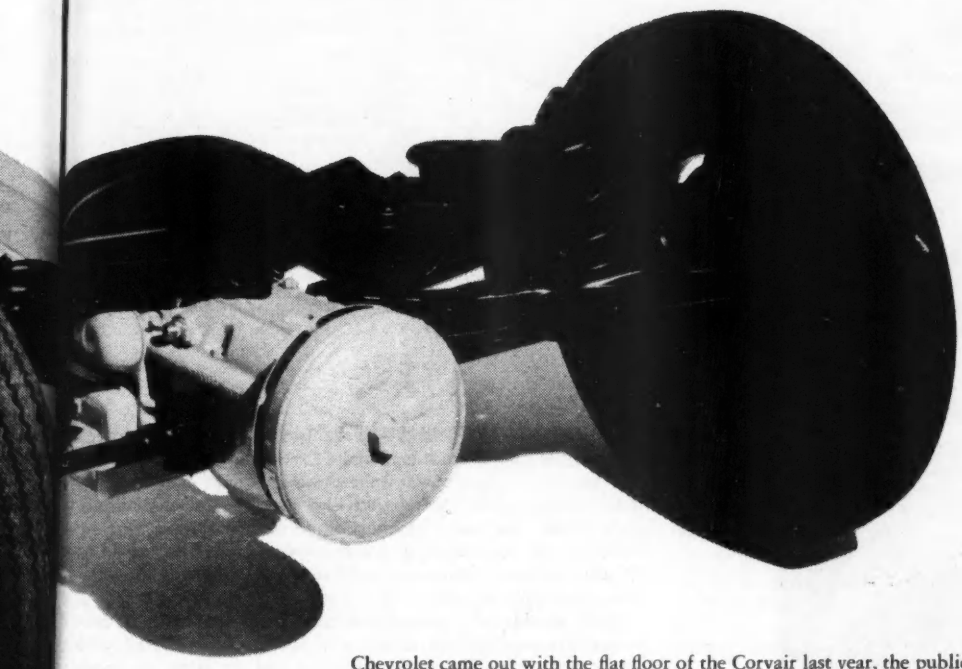
THE MOST *radical* **NEW** *car* **OF THE YEAR WILL INTRODUCE** *engineering* **FEATURES WHICH HAVE LONG BEEN IN THE** *"dream"* **CATEGORY**

Tempest's 1961 power train. Pontiac's compact separates powerplant and transmission. Four-cylinder engine is coupled to transaxle by curved driveshaft.

PREVIEWING THE 1961 PONTIAC TEMPEST

Mad things are going on in Pontiac, Michigan, and the result will be one of the most radical automobiles of the century—the Tempest. Built exclusively by Pontiac, the Tempest will display some of the most unique engineering innovations and designs ever shown to the public—engineering concepts that long have been kept under wraps called "dreams."

First off, there is the big feature of transaxle. The Tempest will be the first American car to achieve the idyllic front engine-rear transmission arrangement so important to a perfectly balanced automobile, and will be the first car in the world to use automatic transmission with this set-up. Built on a 112-inch wheelbase, the Tempest features a rear transmission joined to a new, but time-tested, four-cylinder engine by a flexible propeller shaft, developed by Pontiac. For many years, the large, bulky transmission humps have been the bane of Detroit. Automotive engineers usually overlooked it by saying, "All cars have humps"; yet the public was unhappy with the space-stealer. But when



Chevrolet came out with the flat floor of the Corvair last year, the public was impressed. This year, the new Tempest will have this selling point.

The second solid feature about the Tempest is its big powerplant—a 195-cubic-inch four-cylinder engine. It will run on regular fuel and promises economical operation and top-flight performance. The engine actually is the right bank of the regular Pontiac V-8, and is inclined at 45 degrees. The new, short-stroke Four retains the same components as the veteran V-8, including main bearings, harmonic balancer, tin-plated pistons, aluminized valves and hydraulic valve lifters.

A third new innovation is in the area of suspension allowing independent action for rear wheels, which contributes to a smoother ride. The swing axle rear suspension is one of the Tempest's most interesting items, and came from an original Pontiac design. The Tempest promises to be a most exciting entry in the 1961 race.

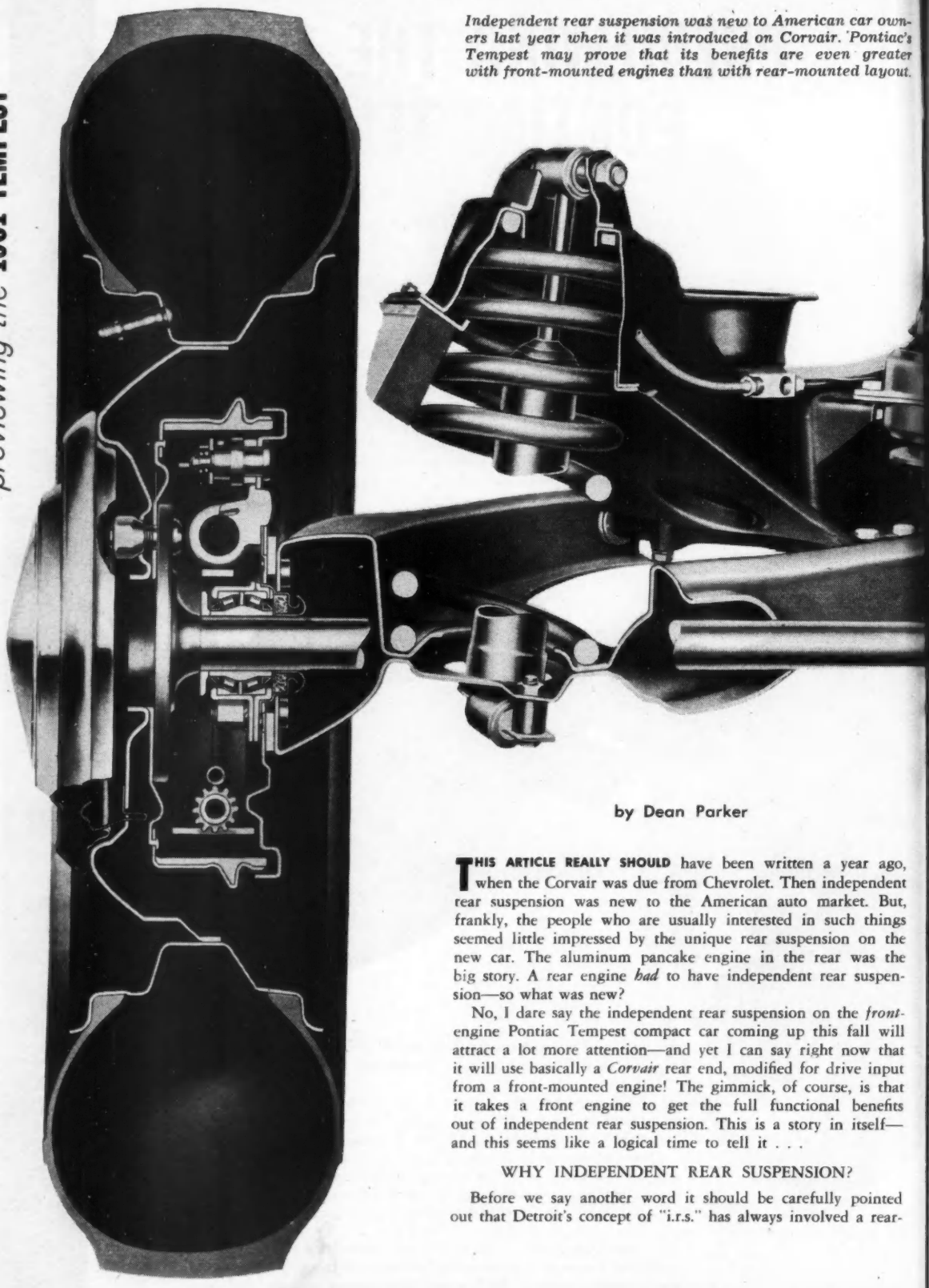
TRANSAXLE

INDEPENDENT REAR SUSPENSION

previewing the **1961 TEMPEST**

INDEPENDENT REAR SUSPENSION

Independent rear suspension was new to American car owners last year when it was introduced on Corvair. Pontiac's Tempest may prove that its benefits are even greater with front-mounted engines than with rear-mounted layout.



by Dean Parker

THIS ARTICLE REALLY SHOULD have been written a year ago, when the Corvair was due from Chevrolet. Then independent rear suspension was new to the American auto market. But, frankly, the people who are usually interested in such things seemed little impressed by the unique rear suspension on the new car. The aluminum pancake engine in the rear was the big story. A rear engine *had* to have independent rear suspension—so what was new?

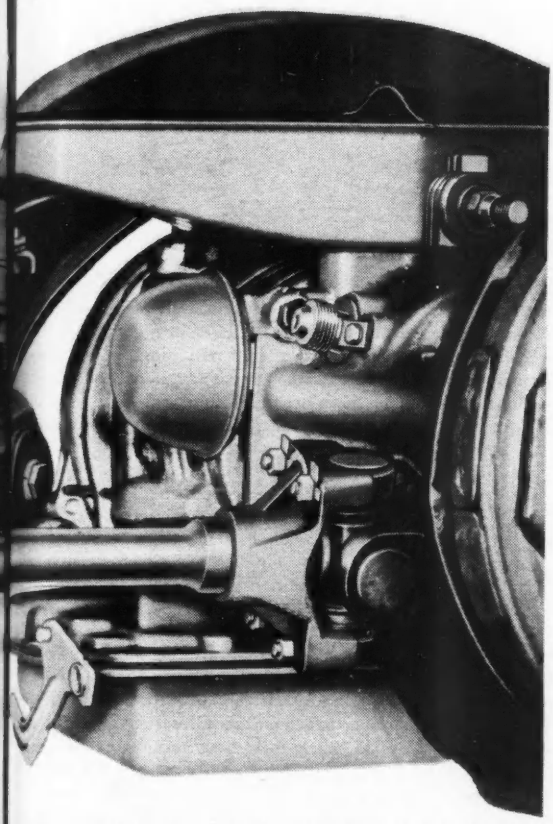
No, I dare say the independent rear suspension on the *front*-engine Pontiac Tempest compact car coming up this fall will attract a lot more attention—and yet I can say right now that it will use basically a *Corvair* rear end, modified for drive input from a front-mounted engine! The gimmick, of course, is that it takes a front engine to get the full functional benefits out of independent rear suspension. This is a story in itself—and this seems like a logical time to tell it . . .

WHY INDEPENDENT REAR SUSPENSION?

Before we say another word it should be carefully pointed out that Detroit's concept of "i.r.s." has always involved a rear-

mounted *transmission*. There's nothing in the basic theory of independently-suspended rear wheels that requires the transmission to be mounted in unit with the differential and final drive. Many successful i.r.s. cars have the gearbox mounted up front on the engine. The new Triumph Herald is an example.

But for Detroit a front-mounted transmission would kill several vital benefits of i.r.s.—benefits so important that, without them, the big switch-over wouldn't be practical or possible.



For one thing, i.r.s. with the rear-mounted transmission would pretty much do away with the floor hump over the transmission and driveshaft. You'll still have a slight hump for the driveshaft, and maybe a bulge in the firewall if they decide to leave the clutch or torque converter unit on the engine; but the driveshaft won't have to swing up and down with the rear axle, so the clearance above it can be reduced a couple of inches. You won't even have a firewall bulge on the new Tempest, as I understand the torque converter is carried on the back of the transmission in the same position as the Corvair. (The drive feeds in through the front of the gearbox and goes to the clutch in back via the concentric shaft arrangement.) Also, the latest experiments with driveshafts using multiple U-joints, or the ones using a flexible cable like a speedometer, suggest we might eventually get away without *any* floor hump.

So how important *is* the floor hump as a sales factor? This is the million-dollar question. A year ago Detroit thought John Q. was really anxious to ditch this nuisance, might even be willing to pay a little price premium for the feature. Early returns on Corvair sales seemed to confirm the low floor hump as a popular feature. But lately there seems to be a loss of interest. Corvair salesmen say a lot of present buyers hardly notice the absence of the hump, and certainly don't act like they value the feature. So we don't know how the ball will bounce on this one. You can bet Detroit ad men will have a few angles figured on how to *sell* the low floor hump before the production men spend millions to *tool* for it!

Then there's the matter of mass and weight distribution. The ideal passenger car would not only have its weight divided about 50-50 between the front and rear wheels, but the major masses like the engine, transmission, axles and final drives, etc. would be spaced relatively *far out* from the center of gravity. This increases the "dumbbell" or "flywheel effect" of the sprung part of the car, so the pitching rate is slowed down on the road —and the car has more of a gliding motion over bumps rather than the familiar chopping motion. Present American cars don't fill the bill here, of course. Their front-rear weight distribution is around 55-45, and the heavy transmission mass is just about *on* the center of gravity. Moving this mass to the rear end improves the pitching characteristics noticeably, not to mention the improved traction by having more of the total car weight on the driving wheels. The new Pontiac Tempest, incidentally, will have a 51-49 weight distribution.

Another significant factor in the ride quality of a car is the relationship between the weight suspended on the springs (sprung weight) and the weight that bounces up and down with the wheels (unsprung weight). Obviously the greater the ratio of sprung to unsprung weight the better will be the ride—simply because the up-and-down momentum of the wheels passing over bumps won't be able to cause as much up-and-down body movement. Independent rear suspension with a rear-mounted transmission gives a great increase in the sprung/unsprung weight ratio at the back of the car. Not only do you add the weight of the transmission on the sprung side, but with the differential bolted to the frame you are taking over 100 pounds off the rear unsprung weight and adding it to the *sprung* weight. Getting rid of that heavy rear axle bouncing up and down will do wonders for the ride on rough surfaces.

And there is another advantage in having the final drive bolted rigidly to the frame or body, driving the wheels through U-jointed shafts: The drive shaft *torque* that tends to lift the right rear wheel on hard acceleration is then absorbed by the frame. You're all familiar with this wheel-lifting effect with a solid rear axle; the right wheel breaks loose first when the shaft torque lifts it, then the differential goes into action to split the torque evenly between the two wheels—and you end up just spinning and going nowhere. A frame-mounted differential eliminates this lifting. Admittedly a limited-slip differential helps compensate; but until all cars have them as standard equipment this will be a selling point for i.r.s., especially with big high-torque engines.

Where does handling fit into this picture? We've heard all kinds of stories. Some experts say the low unsprung weight with i.r.s. greatly improves the handling and stability on rough surfaces; others say the weird rear suspension geometries frequently used with various i.r.s. arrangements promote undesirable oversteer—at least handling characteristics that would be enough different from conventional American cars to be undesirable. In my opinion there's no real meat in these arguments. Detroit engineers know enough about the science of chassis design nowadays to build any kind of handling they want into almost *any* chassis layout. This is especially true when you have approximately 50-50 weight distribution. There will be no excuses for i.r.s. cars to handle any better—or worse—than cars with solid rear axles.

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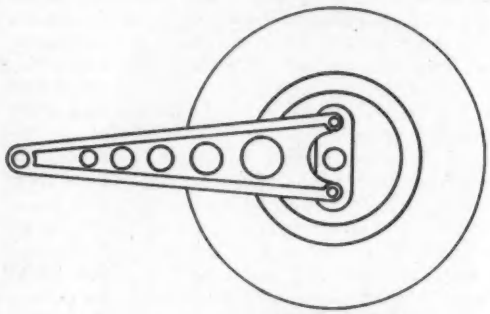
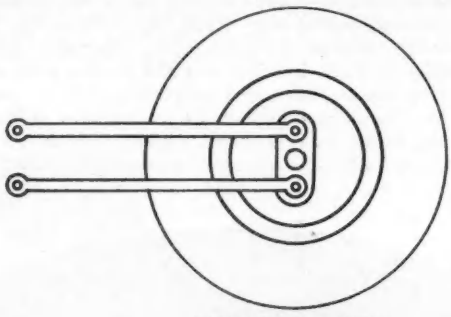
-PROBLEM AND PROMISE



RADIUS ARM



TRAILING LINKS

previewing the **1961 TEMPEST**

TYPES OF I.R.S.

There are many, many possible arrangements of components for independent suspension of the rear wheels or the frame-mounted final drive with non-independent wheel suspension. Dozens of different layouts have been successful in production in the last 30 years. We can't hope to analyze them all—so let's just boil them down to *four* basic layouts, and analyze the general characteristics of each one:

SWING AXLE—The exclusive characteristic of the "swing-axle" rear end is that the two wheels swing up and down about separate pivot centers on each side of the final drive unit. (See drawing.) The half-axles themselves give the necessary lateral or crosswise location to the wheel; fore-and-aft location is usually provided by a separate linkage. On the Volkswagen this is an arm that trails more or less straight back; on the Corvair (and coming Tempest) we have large "A-frames" that trail back diagonally. The Renault Dauphine has a unique slide arrangement at the U-joint that prevents fore-and-aft movement. Any number of spring arrangements can be used.

The swing axle is probably the simplest of all the i.r.s. layouts. You require only two U-joints and the linkage is simple. Unsprung weight is very low. There are also several serious disadvantages: With the wheels swinging on such a short radius there is considerable sidewise tire scrub as they move up and down, and there is also a big change in wheel camber (tilt) with different loads in the car. The influence of tire scrub on tire *wear* has never been very firmly established, and the camber problem could be readily solved with a variable-spring-rate device; but these are subjects that will require attention. Finally, the swing-axle layout has a high roll center, and the combination of forces when the car goes around a corner tend to *lift* the rear end. Both of these effects combine to promote heavy *oversteer*. This effect *can* be controlled (look at the good job they did on the Corvair)—but it requires careful design.

LOW-PIVOT SWING AXLE—In this layout the wheels swing about a *single* point, in the center of the chassis, below the differential. There is only one U-joint in the center, which swings on the shaft with the right wheel—and the differential swings with the left wheel. So far only Mercedes-Benz and Porsche use this layout. There are several advantages: The roll center is lowered to the central pivot point, so the oversteer tendency is greatly reduced. The swing radius of the wheels is considerably lengthened so there is less tire scrub. Also there is only one U-joint to maintain and pay for.

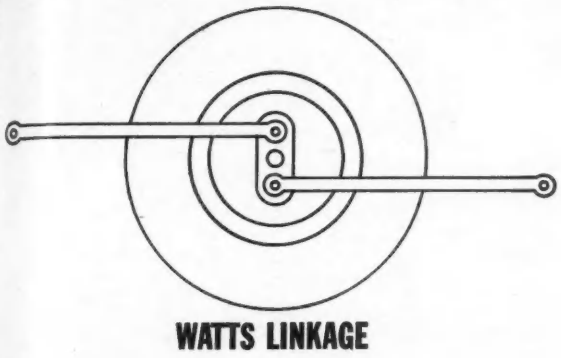
In fact it's pretty hard to find serious fault with the low-pivot swing axle. Ground clearance below the differential is reduced somewhat. The mounting for the single low pivot might cost more than the extra U-joint it saves. At first glance it would seem that the U-joint and differential swinging up and down with the wheels would increase the effective unsprung weight. Actually these parts are so close in to the axis of rotation that their "flywheel effect" is very low, so the effect on ride is negligible. The deal looks real good on paper.

LINK-TYPE—In this arrangement our rear wheels are suspended on a special linkage much like the front wheels of a modern car. That is, they don't swing up and down on a fixed radius, but can be given any motion that is designed into the linkage. The roll center can be put any place the designer wants it. His linkage can be lateral A-frames (like most front suspensions), diagonal links, trailing arms or fore-and-aft Watts links with lateral control by a sway bar. There are many possibilities. Any type of spring layout can be used. As far as the drive is concerned this arrangement requires *two* U-joints on each side, and splines to allow in-and-out motion of the axle shafts.

The link-type rear end has the big disadvantage of more cost and complication. The only important advantage is that wheel motion geometry can be precisely controlled for optimum handling, cornering, and minimum tire scrub. These advantages must not be very important—because link-type i.r.s. is becoming *less* popular, not more so.

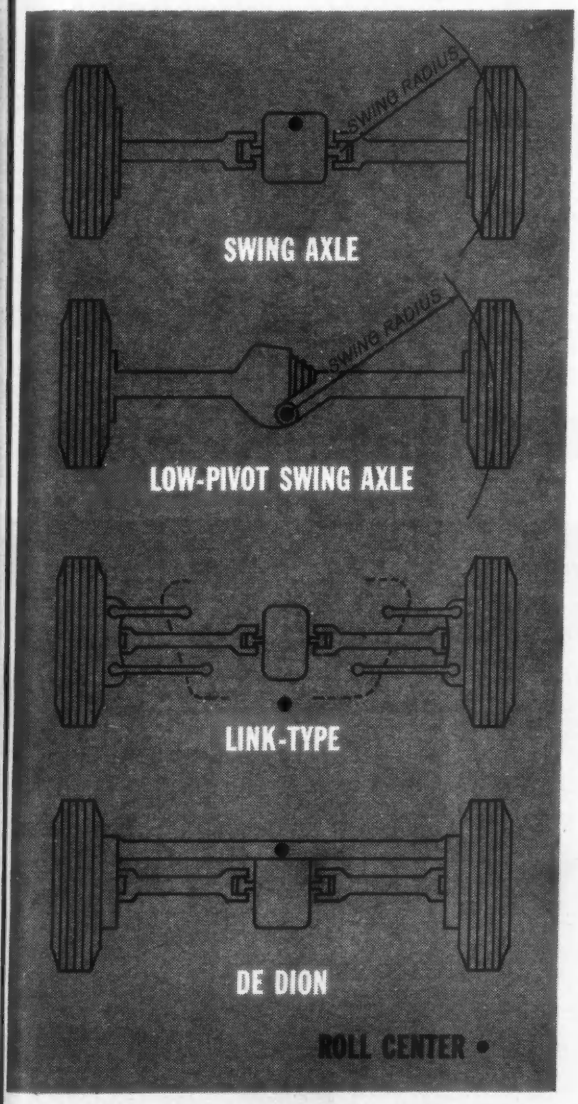
DE DION—Here our two rear wheels are tied together by a rigid tube—actually equivalent to a "dead" axle—and the wheels are driven through U-jointed half-shafts from the frame-mounted differential. The geometry of the whole deal (wheel motion, roll center, etc.) is about the same as a conventional solid rear axle, except that we use a linkage to control wheel motion rather than depending on massive leaf springs as with conventional Hotchkiss drive). Just as with the link-type rear end we need two U-joints on each side and a sliding spline for in-and-out movement.

Big advantage of the De Dion is that we get away from all the unusual wheel geometry-roll center relationships that give the strange handling of some i.r.s. systems. A good De Dion set-up will drive and handle a lot like your present car. Also the strong dead axle tube tying the two wheels together permits a little lighter and cheaper suspension linkage. A variety of spring layouts are possible. (One experimental Detroit De Dion layout I know of has coil springs acting directly on the De Dion tube.) Biggest disadvantages are that you have more unsprung weight than most i.r.s. set-ups, because the cross tube itself is part of the unsprung mass—and we must always remember the added cost of the extra U-joints and spline arrangement.



WATTS LINKAGE

The link-type rear end has disadvantage of more cost and complication. Wheel motion geometry can be precisely controlled for maximum handling, cornering, little tire scrub.



There are dozens of possible layouts for independent suspension of rear wheels. These four, however, are some of the most popular and successful types used in recent years.

PROBLEMS AND PROMISE

There is no question that the major problem with independent rear suspension on Detroit automobiles is the *cost* factor. It just can't be manufactured as cheaply as the old solid rear axle. We've got the mounting of the differential and transmission on the frame (or unit body), we have the cost of one or more additional U-joints (and you still have to have at least two in the driveshaft), the cost of grease seals in the rear end, the cost of the wheel control linkage. Some engineers estimate this will add up to at least $10 to $20 per car even under the best conditions. Not only this, but long-established tooling and assembly lines for conventional solid rear axles would have to be completely changed. This added cost of factory conversion is over and above the cost of the parts. How are they getting away with i.r.s. on an "economy" car like the new Tempest? Simple. They *had* to have i.r.s. on the rear-engine Corvair—and Pontiac is basing its rear end on these production parts. There will be very little new tooling. This wouldn't be the case if some big car wanted to switch over; the conversion would have to be tooled from the ground up. It will cost millions.

And there are other problems. Noise and body rumble will be critical. With the transmission and final drive mounted in unit on the back of the frame—or direct on a unit body—noise and vibration that have previously been partly isolated by springs will have a direct line to the passengers. Detroit engineers have made wonderful progress with rubber mountings and sound deadeners in the last three years; but i.r.s. will keep 'em hopping, I assure you!

The problem of decreased trunk space is frequently mentioned in connection with i.r.s. With the transmission and all that additional linkage back there it seems inevitable that trunk space will be cut some. The question is whether the slight loss will be a sales factor. Most experts are betting it won't be. It could turn out like the floor hump in the Corvair —many people won't even notice it's not there. No, it looks now like Detroit's really *big* problems with i.r.s. will be the cost and noise isolation.

So what can we look for, and when?

Of course we'll see the new Pontiac Tempest in another month, based on Corvair rear end components. After that we're not so sure. Most of the i.r.s. rumors in the big-car field seem to revolve around Cadillac. They *are* well advanced, but I can assure you that a number of other companies have *more* i.r.s. test cars on the road. None of them will be in production for the 1961 model crop, but we could see one or two versions in '62. The rumored smaller luxury Cadillac in the Thunderbird class could be a likely beginning point. It's very likely we'll see i.r.s. first on a high-priced car, and with Ford leaning toward front drive, that leaves GM and Chrysler.

It's pretty early to speculate on the general layout of early i.r.s. systems. Right now interest seems to be about equally divided between swing-axle and De Dion arrangements. The low-pivot swing axle is being tried, too. Detroit may come up with one exclusive, though: *Ball Splines.* The most recent research indicates that the *friction* in a conventional sliding spline layout considerably changes the handling and ride feel of an i.r.s. under certain conditions. Detroit would like to do away with this friction. A ball spline works something like a recirculating ball steering gear, has the two mating sections of the spline separated by dozens of small ball bearings riding in precisely-machined grooves. Most of the technical problems have been solved; now it's just a matter of *money!* My prediction is that we'll see ball splines on early Detroit i.r.s. systems.

And I'm sure you'll find that i.r.s. will give you a better-riding, better-handling car. Wait and see. /MT

Dart's new reverse sweep fin treatment takes on a different aspect when seen directly from the rear.

dart STEPS INTO THE COMING YE

Using the same basic body shell and without making a drastic change in styling, Dart's engineers have managed to get a new visual appearance.

From the front it will be difficult to tell a Dart from the senior Dodge Polara. Concave grille, headlights and bumper are all shared by both lines.

NG YEAR WITH STRONG NEW STYLING

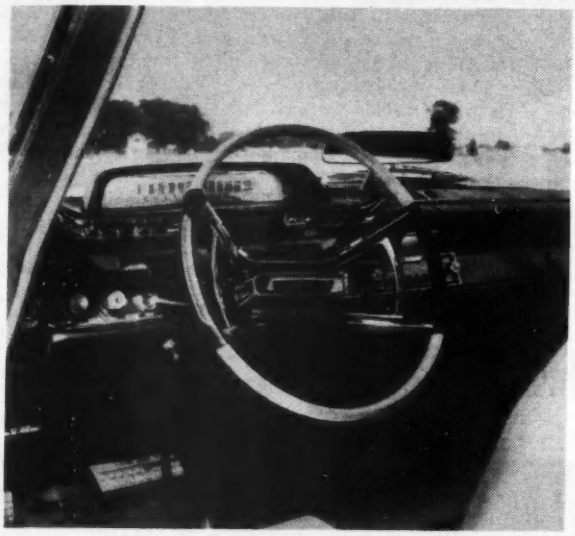
WITH ALMOST everyone's thinking geared to compact cars recently, many persons overlooked the somewhat remarkable first year showing made by the Dodge Dart. The car was conventional and had no extraordinary gimmicks. Furthermore, it didn't get a tremendous surge of free publicity because it was part of an entirely new class of automobile size—the Dart is not a compact by anybody's yardstick. Yet, the line established itself firmly in a size and price classification where there have been no serious freshmen contenders for years. This is nearly as revolutionary as compact cars.

Dodge executives are obviously enthusiastic about the Dart's initial record and this year they are using the same formula. The styling is changed, but not radically; engineering developments are mostly refinements; and slightly more emphasis is being placed on economy. Back from last year is the big selection of body styles, five engines and a wide choice of accessories.

Dart's 1961 visual appearance is a facelift that retains last year's basic body structure. The overall silhouette has not been altered extensively and the major changes are the wide concave grille and sculptured fenders in front, and the reverse fins which taper towards the rear.

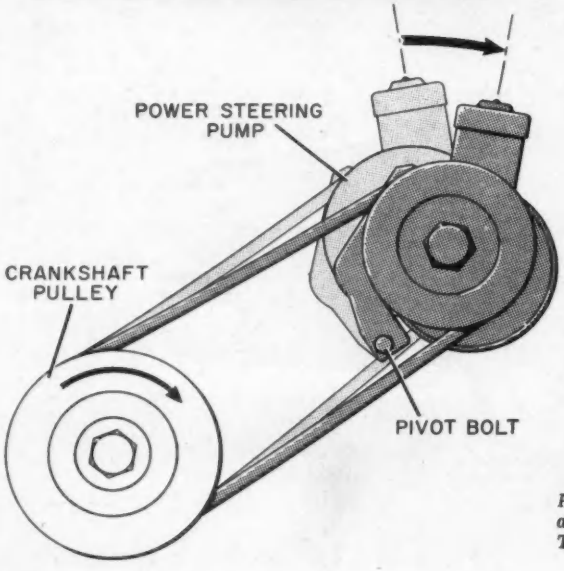
Last year the differences between the longer-wheelbase Dodge and the Dodge Dart, although not extensive, were apparent both front and rear. This year the front end treatment is identical except for a medallion in the case of Dodge. The rear quarter panels reveal the only distinctly different exterior appearance. On the Dart line the quarter panel sculpturing rises from the body just behind the rear door and tapers rearward, ending in an abrupt reverse curve which sweeps forward into the body side. Directly below, the tail lights wrap around the side and rear at right angles.

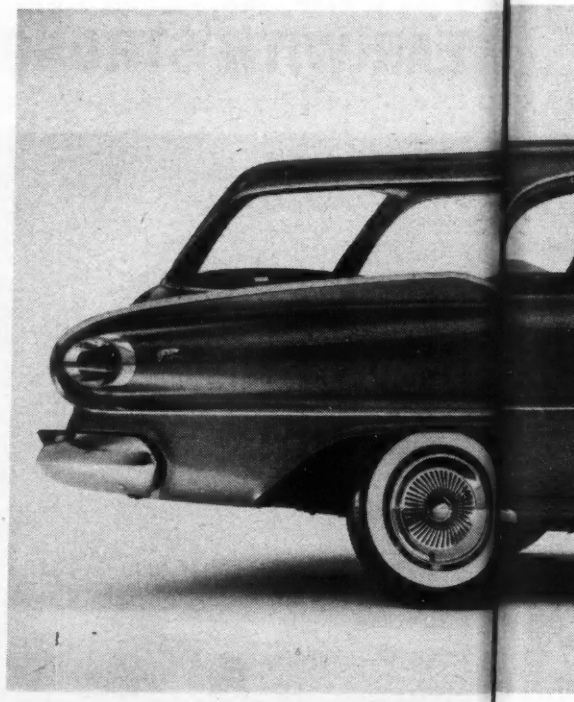
On station wagons the difference is insignificant. Dart wagons have Dodge's identifying rear styling (a less abrupt reverse curve which encircles a torpedo-like tail light). The only visual difference between a Dart wagon and the wagon offered by



Passenger compartment is not extensively changed this year. Instrument panel is re-styled, new steering wheel and fabrics use more nylon.

dart





Power steering pump has a well engineered mount that allows it to swing out when the pump torque level increases. Thus the belt is tightened as more power is required.

Dodge is an emblem in the grille and another on the front fender.

Inside, the changes include new steering wheels, and redesigning of the instrument panel. The re-styled speedometer cluster, with sculptured nacelles curving upward at the outer ends, is the major focal point. The horizontal portion of these nacelles contain the pushbuttons for the transmission on the left and controls for fresh air and heat on the right.

The 118-inch-wheelbase Dart line offers an unchanged selection of 1961 models. It is available in three series: Seneca, Pioneer and Phoenix, with 23 body styles. All models except the convertible will be available with the six-cylinder engine. Other classifications of styles are two- and four-door sedans, two- and four-door hardtops, and six- and nine-passenger station wagons.

This year the Dart has basically the same engine line-up, but a number of changes and design modifications will alter their performance.

For economy, the 170-cubic-inch Slant Six is still the backbone of the Dart engine line-up. This year the compression ratio has been reduced from 8.5 to 8.2-to-1. According to preliminary engineering information this has been done to give the engine greater tolerance to lower fuel octane ratings and reduce the possibility of detonation as carbon deposits build up in the combustion chambers. Although horsepower ratings have dropped from last year's 145 to the current 140 hp, the torque figure remains the same, 215 lbs.-ft. It is doubtful whether this difference will make any significant change in overall economy. The calibration of the choke and carburetor have also been revised and the camshaft timing has been advanced eight degrees. While these alterations are reported to be for better low-speed performance they are characteristic of changes made necessary by the lower compression ratio. Strangely enough, with emphasis currently on lighter construction materials, the aluminum intake manifold used last year has been replaced by a cast-iron manifold of identical design.

The standard powerplant in the Dart V-8 line is the 318-cubic-inch engine with a single two-barrel carburetor that was introduced last year. This ohv V-8 is also available with four-barrel carburetor as an optional powerplant for all Dart models.

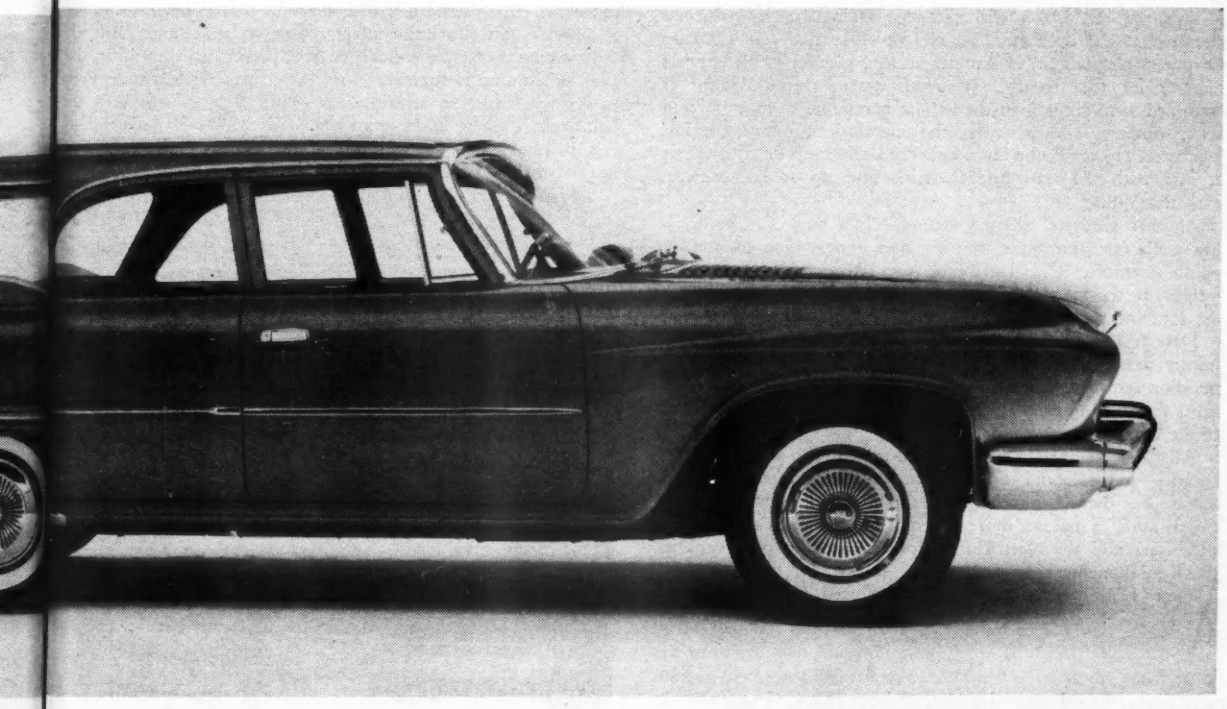
A new high-performance version of the 361-cubic-inch V-8, with a four-barrel carburetor (replacing last year's two-barrel), is offered as an optional engine for the Dart. The compression ratio has also been lowered, from 10 to 9.0-to-1, but this powerplant will have special distributor advance characteristics and modified valve timing, making it definitely necessary to use premium fuel.

Top of the performance engines for the Dart line will again be the ram induction version of the 383-cubic-inch V-8. Standard equipment with this engine includes dual four-barrel carburetors, air induction manifolding, dual exhausts, special camshaft and valve spring dampers.

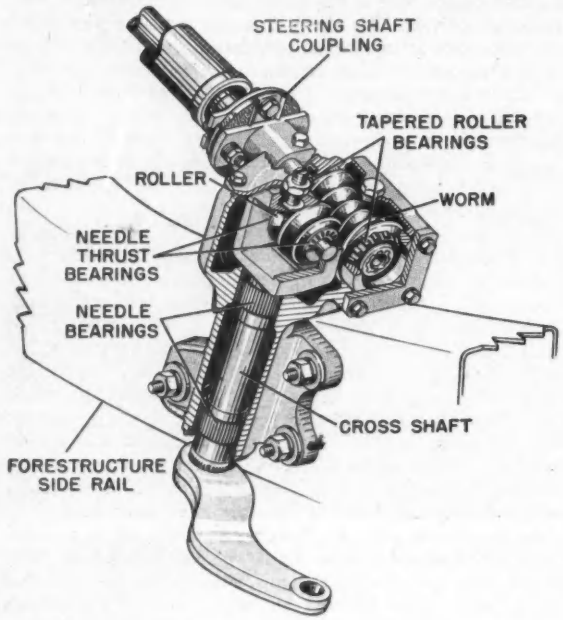
All Dart V-8's (with the exception of the ram induction package) will have carburetors with two minor engineering changes. One is the addition of a two-stage, step-up jet which was included to give smoother part-throttle performance. But more important, in terms of reducing carburetor maintenance, is a new synthetic rubber tip for the float needle that will help eliminate carburetor flooding caused by dirt which sometimes becomes embedded between the needle valve and seat.

An innovation with all Detroit cars this year is a closed crankcase ventilating system which will be installed on every car intended for sale in California. Blowbys are not new, but this is the first time they've been part of standard Detroit cars —and the first time that Detroit has included a special mechanical attachment for cars sold in a specific area. The reason for the blowbys is the current publicity and public concern over California's smog problem.

The Dart's closed crankcase ventilating system consists of a special carburetor, a spring-loaded valve and a flexible tube connecting this valve and the carburetor. The carburetor is



This isn't a Dodge Polara station wagon, it is actually a Dart. Dart wagons have not only the same basic body structure but the identical styling design.



Dart mechanical steering units have two modifications to insure smoother operation. Both the fabric joint and needle bearings are refinements of previous components.

dart

specially calibrated and contains a fitting just below the throttle blades into which the crankcase vapors are drawn by suction in the intake manifold.

This year all Darts will recharge their batteries with an alternator. The alternator, which was first used on Chrysler Corporation's Valiant, is actually an AC generator. To convert the current for the DC electrical system the alternator is equipped with six silicon diodes. Its maximum output is rated at 35 amperes and 12 volts, the identical rating of the DC generator. However, the alternator can deliver up to 10 amperes at idle with the six-cylinder engine and up to six amperes with the V-8.

Another electrical change this year is a new distributor. It has a die-cast aluminum housing and a new type of breaker point assembly. The distributor uses nylon to decrease the weight of the moving arm and to minimize friction between the cam and follower blocks.

Dart V-8's will have a solenoid shift starter which is a luxury item that is new to the line but not to Chrysler Corporation cars. The solenoid, mounted on top of the starter motor, starts the shifting mechanism when the ignition switch is turned to the start position.

All these changes in the electrical system, the alternator, distributor and solenoid shift starter, reflect engineering refinements. But there is another reason for their adoption. Chrysler Corporation is making more and more of the parts that go into their cars and the electrical equipment division now supplies these components.

Every Dart manual transmission has been changed this year and a new heavy-duty manual has been introduced. The automatics have been carried over unchanged.

The manual transmission used with the six-cylinder engines has new gear ratios of 2.71 and 1.83 as contrasted with 2.50 and 1.68 last year. These slightly higher ratios should provide somewhat better acceleration, but more likely they have been changed to compensate for the reduced horsepower rating of the six-cylinder engine.

Standard manual transmission for the 318-cubic-inch Dart V-8 has been reduced in weight and this year has a one-piece cast-iron case.

The heavy-duty manual transmission will be standard equipment with the 361- and 383-cubic-inch V-8's. It is an entirely new transmission with all helical gears and is rated much higher in torque capacity.

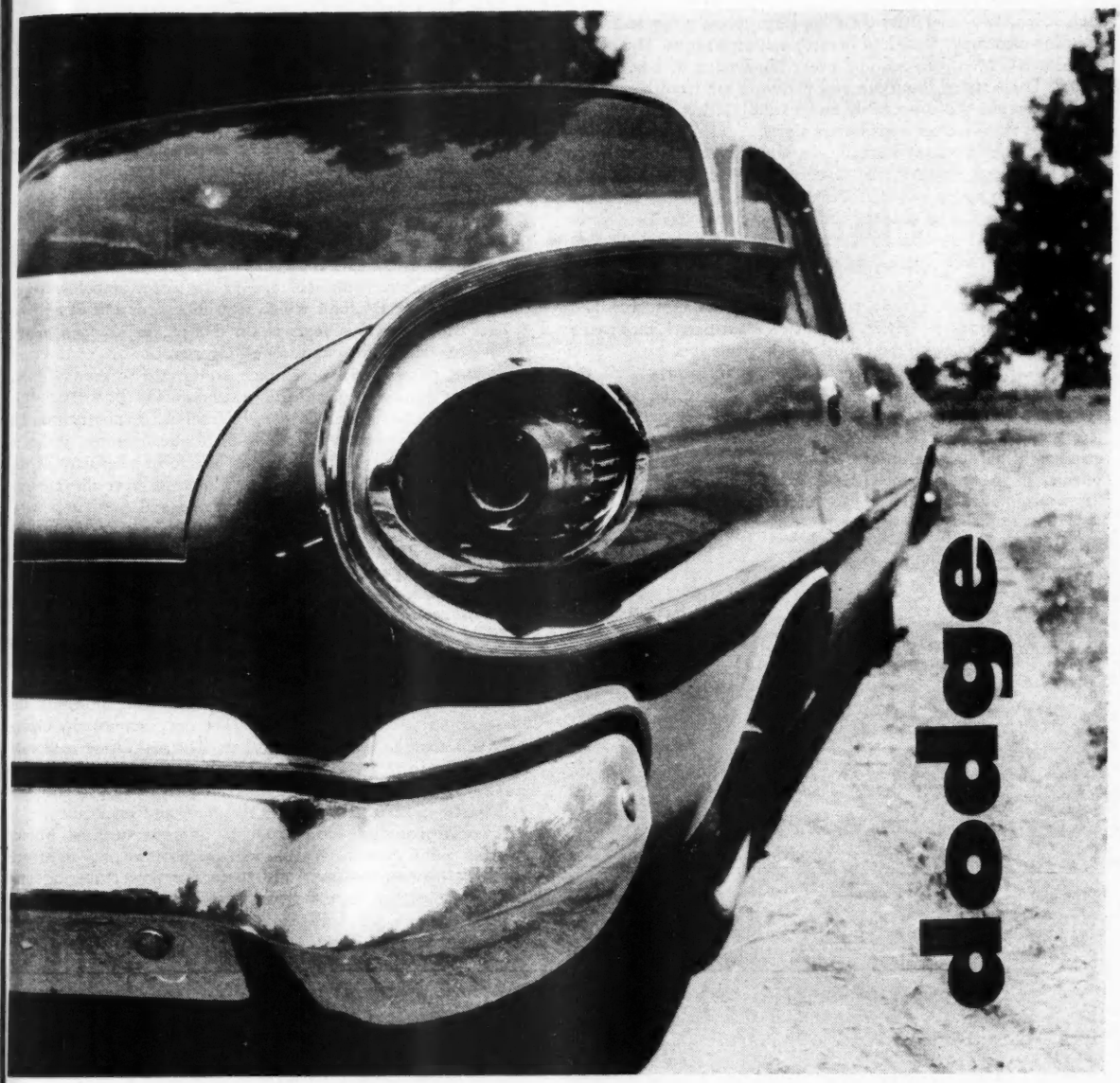
Dart's suspension is the familiar Chrysler Corporation system —torsion bars in front and asymmetrical leaf springs in the rear. For 1961, however, an additional leaf has been added in the rear on all six-cylinder models. The extra spring will not change the maximum load capacity nor the riding qualities, instead it has been added to lengthen the life of the rear suspension system.

Other changes in the 1961 Dart's engineering include a fabric-reinforced rubber coupling for manual steering; refinement of the step-on parking brake; a new method of retaining the underhood fiberglass pad; and added rustproofing on the inside of the door sills.

This year Dart goes a step further in economy thinking and is offering a tire which engineers predict will last 15 per cent longer. A zigzag pattern with L-shaped bars has been developed to provide less tire noise, greater traction and longer life.

Economy has even influenced the power steering unit this year. The pump is engineered so that it pivots freely and when power (to assist in steering) is required it swings into the belt, tightening it for maximum efficiency. When power steering is not being used, only the weight of the pump rests against the belt. The result should be longer life for the belt. /MT

Trunk capacity has not been changed extensively although the spare tire has been moved from in front to its present position in the rear area.



THE BIG DODGE offers FEWER STYLES and SERIES FOR '61

TWO YEARS AGO Dodge was Chrysler Corporation's second most popular car. It still is but the senior Dodge has been completely overshadowed by its neophyte companion line—the Dart. Automotive observers have been speculating not only about the Dodge but the entire classification of cars it represents, the medium-priced luxury automobiles. There is a definite trend in this field and each year significant and even drastic changes are being made. The 1961 Dodge is an excellent example of what is happening. There will be less emphasis placed on the herald bearing Dodge than on any other car the Division makes. There are fewer body styles, there is less visual difference between the Dodge and the Dart, and this year's engineering changes are mostly refinements.

In the matter of exterior styling this year's Dodge is more of a facelift than anything else. Although the treatment in front and along the rear-quarter panel is decidedly different, there are faint, familiar traces of last year's design.

In front the dual headlights have been lowered and set in a concave grille. To accent lowness the entire grille is cowled by the hood and front fenders. The only difference in front between the Dodge and the Dart is the addition of a die-cast aluminum grille medallion.

Dodge's profile silhouette is dominated in front by a sculptured peak on the fenders. Fins are still the major focal point in the rear but they are not the true fins of last year. These fins are reversed with their highest point in front, then tapering sharply to the rear where they encircle the tail light and return as a molding slightly below the belt-line.

Dodge's interior this year features a new steering wheel, redesigned instrument panel, door panel and modifications in the seat design.

The senior Dodge will have only six 1961 body styles: a four-

door sedan, two- and four-door hardtops, convertible and six- and nine-passenger, four-door hardtop station wagons. The name Matador has been dropped and every big Dodge will be called Polara. Three styles, the sedan and hardtops, are from last year's Matador series; the convertible and hardtop station wagons are carryovers from the previous Polara series.

The engine line-up is basically the same but several modifications have been made in the powerplants. The 361-cubic-inch ohv V-8 with single two-barrel carburetor is again the standard engine for the Dodge but the compression ratio has been lowered to 9.0-to-1 so that it will operate on regular fuel. The intake valves have been increased in diameter to improve breathing.

For performance, Dodge will still offer the 383-cubic-inch V-8 in two separate power options: a four-barrel carburetor and ram induction with dual four-barrel carburetors.

Two carburetor improvements have been incorporated on both the 361 and the single four-barrel version of the 383. For better mixture and smoother throttle response a two-stage step-up jet has been added. The other modification, Dodge engineers claim, will virtually eliminate carburetor flooding due to impurities in the fuel or fuel line. It is a synthetic rubber tip for float needles which will greatly decrease the possibilities for trouble caused by dirt embedded between the needle valve and seat. Also new this year is a closed crankcase ventilation system which will be installed on all cars sold in California. Dodge's version routes crankcase vapors into the intake manifold where they pass into the cylinders and are burned.

Dodge's 1961 electrical system is somewhat changed, too. New this year are an alternator, voltage regulator and the solenoid shift starter which was formerly used only on Chrysler Corporation's most expensive cars. The alternator is a three-phase alternating current generator which has the same maximum output as the DC generator which was standard last year. However, the alternator will deliver up to six amperes at idle compared to the DC unit which had no idle output at all.

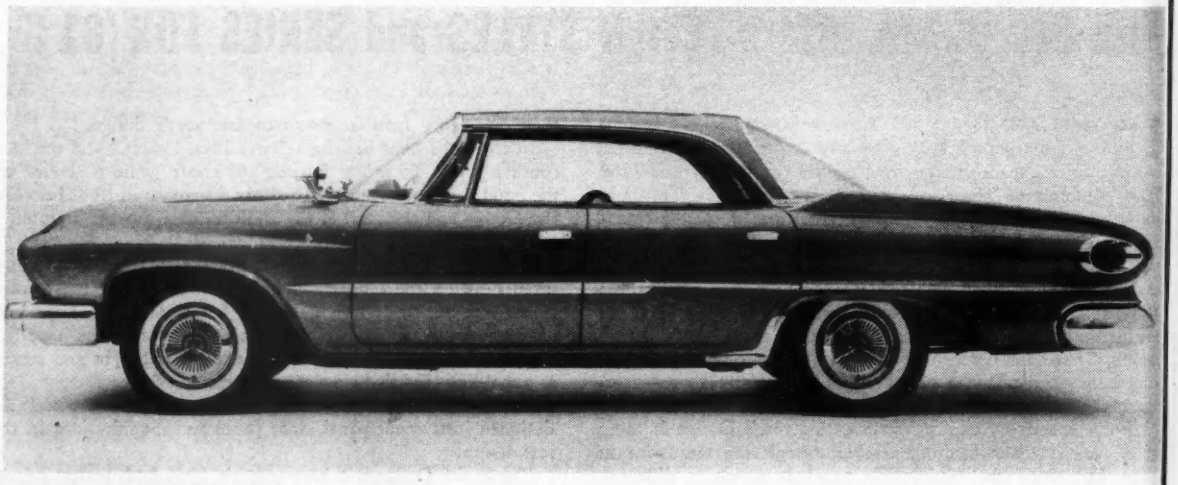
Back from previous years is the Torqueflite transmission, a three-speed automatic with torque converter, but one of the more important power train developments for 1961 is an all-new heavy-duty manual transmission which is standard for the 361- and 383-cubic-inch engines. It has all helical gears synchronized on second and high. With a 3¼-inch spread center design to reduce gear loads, plus wider gears, the torque capacity of this new transmission should show a big increase over the previous design. Ratios are 2.55 low, 1.49 second and 3.34 in reverse. The "long" second should be an excellent gear for traffic and mountain driving. An 11-inch clutch accompanies this transmission when coupled to the 383-cubic-inch engine. With other power teams a 10½-inch clutch is standard. Although this new transmission is an improvement over last year's model there is another reason it was adopted. Chrysler Corporation is building more of the components of their cars and this new transmission is a Chrysler-built product.

Dodge's 1961 suspension is the torsion bar springing that has been so successful in the past. The only noteworthy change has been made in the shock absorbers. The seat of the base valve has been narrowed and the grooves made more shallow. These minor changes will reduce the force required to open the valve and should cause it to operate more quietly and smoothly.

Two changes have been made to improve steering. Manual steering effort has been lessened by a new fiber-reinforced coupling between the gear and shaft. For power-steering units a new pump that increases belt tension as the pump pressure becomes greater has been developed. The pump pivots on its mounting bracket and is so located that when the engine is not

dodge

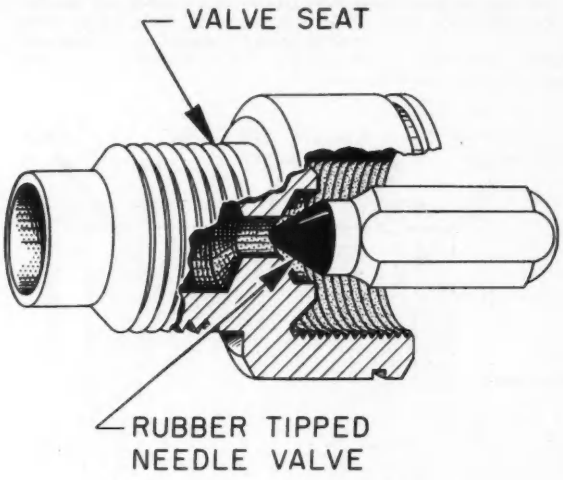
Dodge has only one series designation this year, the Polara. Model identification of the 122-inch-wheelbase car is most evident where the reverse fin encircles the tail light.



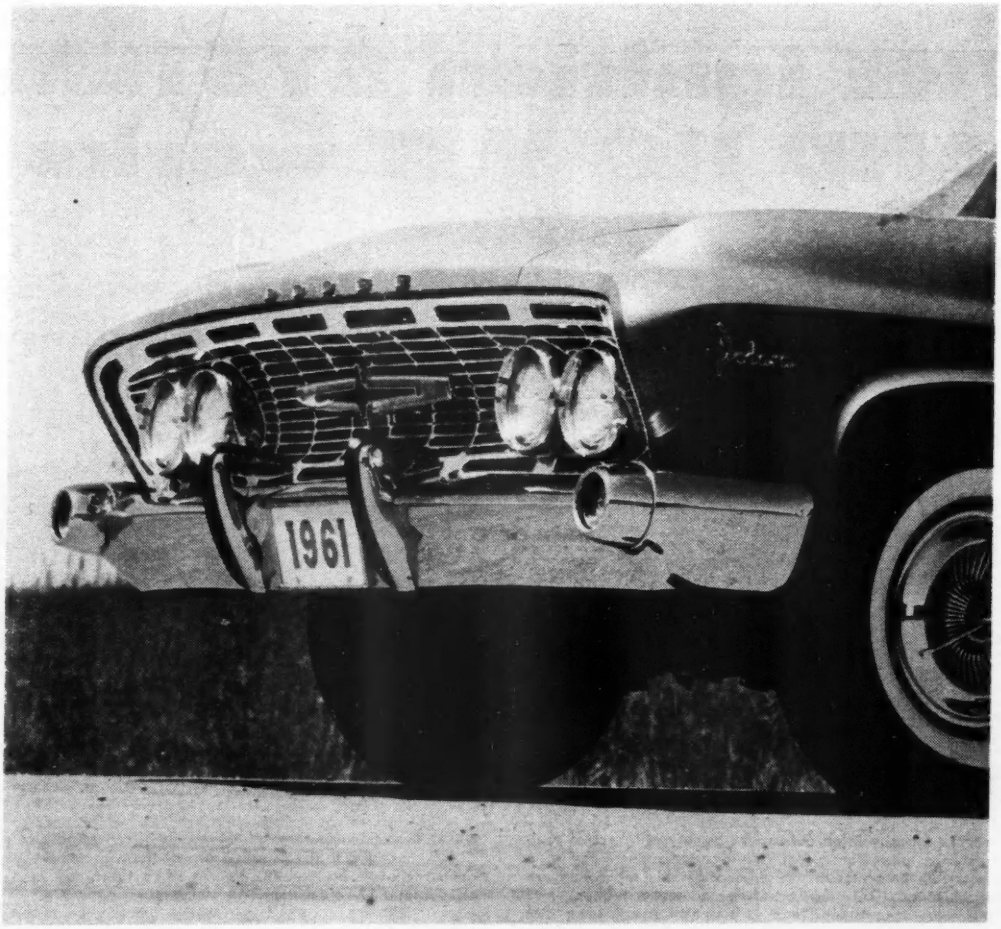
running, only the weight of the pump pulls against the belt. When the engine is running the load imposed on the pump by the power steering system causes one side of the belt to be tighter than the other. The geometry of the pump mounting is such that this difference in forces tends to pull the pump away from the engine, tightening the belt with a force proportional to the load on the pump.

One of Dodge's improvements for 1961 will have nothing to do with mechanical operation or visual appearance. It is actually only a change in manufacturing procedure, but the benefits are equally important to many more apparent developments. Chrysler Corporation, which last year introduced a rather involved process to prevent corrosion, has added two more steps. First, a special spray of primer is applied to the inside of the door sills while the body is hot. Second, after the final baking process, the inside surfaces of the door sills are given a final coat of high-melting-point wax compound.

Wrapping up Dodge's 1961 picture are several minor changes that are relatively unimportant to overall design. The parking brake, for instance, is lower and has a larger stroke for easier application and is moved slightly to be in a more convenient location for the driver's left foot. And the spare tire, which was far forward last year (making it hard to get out but easier to load the trunk), has been moved to the rear (where it is easy to get out, but harder to load the trunk). /MT

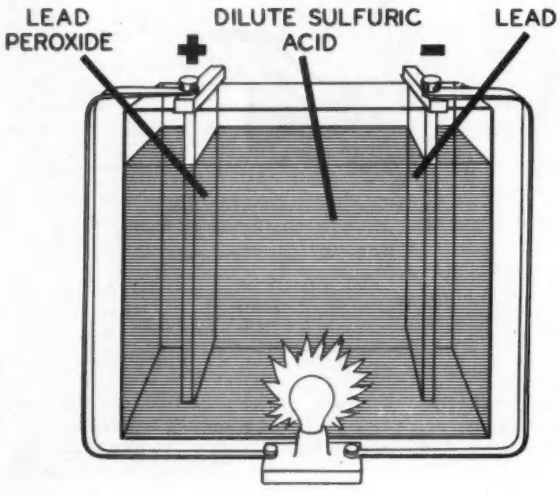


One of the two refinements of Dodge carburetors, the rubber-tipped needle valve, is shared by most Corporation cars. Resiliency of the tip will help eliminate flooding problems.



DODGE'S 1961 STYLING, WHILE EXTENSIVELY CHANGED FRO M LAST YEAR, IS STILL THE SAME BASIC UNIT-BUILT BODY.

1 The basic lead-acid storage cell consists of a positive and negative electrode plate immersed in a container of dilute sulfuric acid. The positive plate contains an active energy compound, such as lead peroxide, and the negative plate is of lead. The electromotive force developed by this cell is about 2.2 volts.



KNOW YOUR CAR

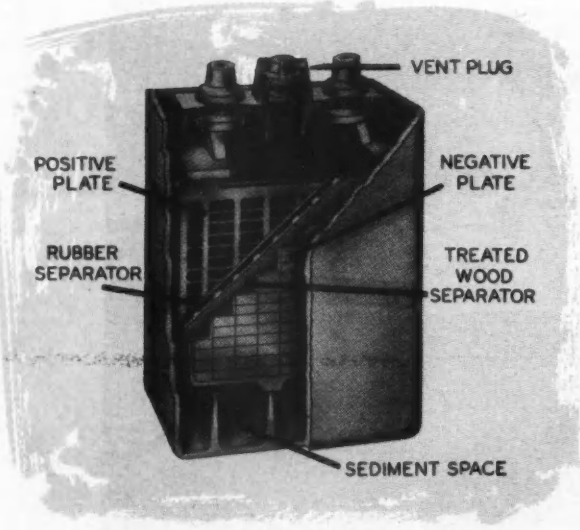
by Robert W. Temple

IN THE SIMPLEST of terms the automobile engine needs just two elements in order to operate: fuel and the spark to ignite it. In last month's study of carburetion and the fuel supply system we traced the path of the fuel on its way to combustion. Now we are ready to see how that all-important little spark is set off in the cylinder just in time for proper engine operation.

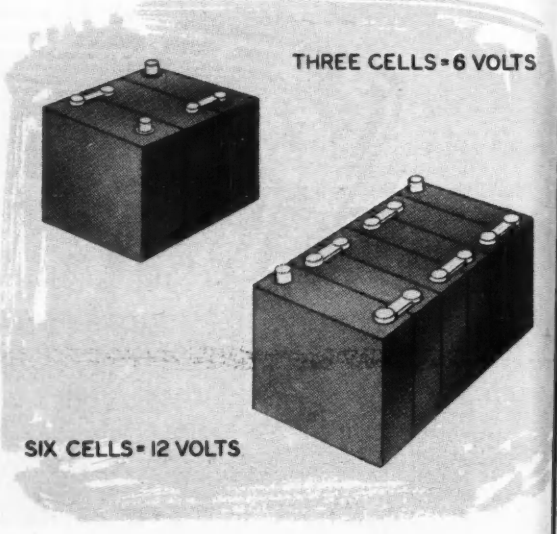
An overall picture of the ignition system is presented on the opposite page. Each member of its team is shown in its proper perspective. Each, from battery to generator to regulator to coil to condenser to distributor to spark plug, will be studied on the following pages. As with all teams, every individual member of this system has a particular function to perform in a particular fraction of a second. Failure to do so can ruin the whole system. An understanding of these functions is essential if you want to know your car and keep it operating at its full potential.

Next month this series will follow the driving power of the engine as it goes to the drive train. The first units in the drive train are the clutch and the transmission, and they will be the main subjects of our study.

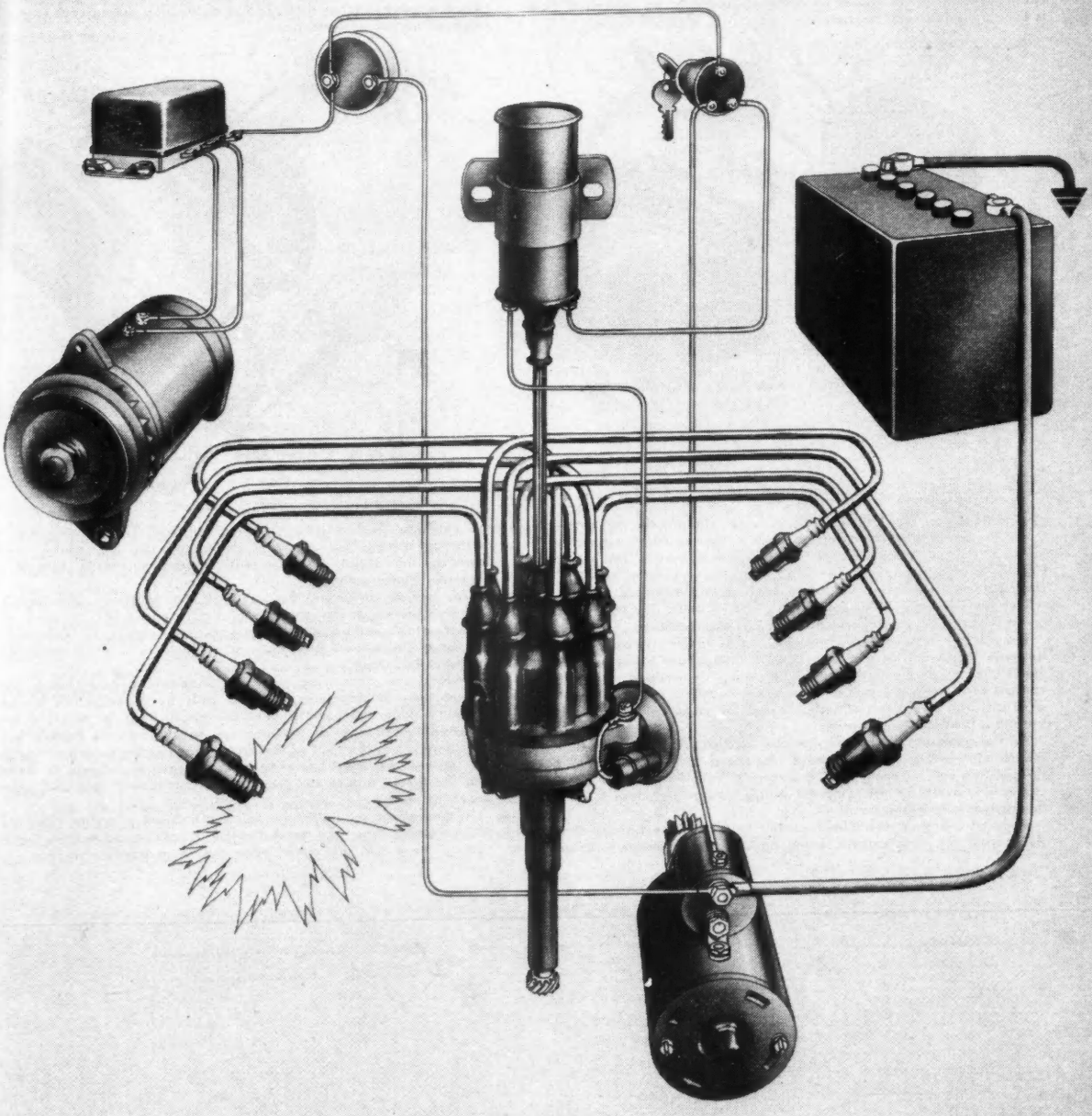
THE ignition SYSTEM AND HOW IT works



2 To obtain more capacity in an automotive battery cell, several positive and negative plates are used. To prevent the possibility of a short circuit between the plates in this close proximity, separators are used between the plates. These may be of treated wood, rubber, or of some other insulating composition. There is a space beneath the plates for sludge to prevent a short circuit from this source. The voltage of the cell remains at 2.2 volts.



3 (A) By combining three of these cells in series (positive post of one cell connected to the negative post of the adjacent cell), we form the familiar six-volt battery. (B) By the same token, six cells hooked in series form a 12-volt battery.



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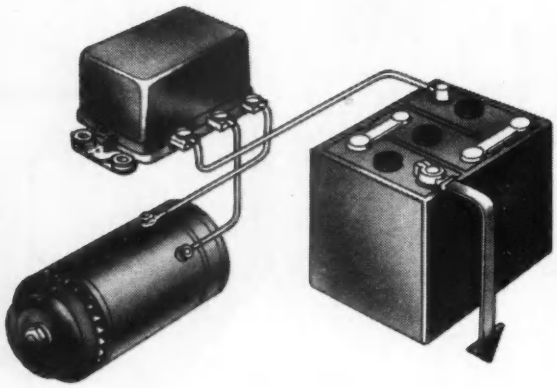
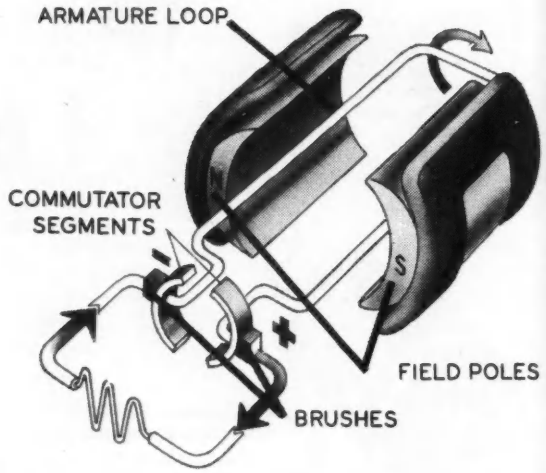
4 Since a battery is an energy storage reservoir only, it would soon be depleted by the demands of the automobile electrical system if it did not have a source of power to replenish it. The battery is recharged by a generator which is driven by belt from the engine crankshaft. To prevent battery discharge when the engine is not running, or an overcharge when it is, the generator charging rate must be controlled. This is done by a generator regulator.



5 A current produced by a battery is direct. This means that the polarity remains constant with the current flowing in one direction only. To replenish the battery charge then, we need a direct current (DC) generator. A wire loop rotated between the poles of a magnet will produce a current, but this current will change directions as the loop passes the alternate poles, thereby producing alternating current.

To prevent this change in current direction, a commutator is provided. A commutator is a conducting ring split into halves with one end of the armature loop attached to each half. As the loop rotates, the brushes pick up current from the armature loop in one direction only since the commutator switches halves of the loop during each revolution. This results in direct current.



9 The generator regulator is a device which controls the charging rate of the battery. When the battery is low, the regulator automatically increases the generator charging rate until the battery is brought up to a fully charged condition. At this point the regulator reduces the charging rate to prevent overcharge damage to the battery.

The modern regulator is composed of three units: 1) Circuit breaker or cut-out relay. 2) Voltage regulator. 3) Current regulator.

The cut-out is a simple magnetic switch which closes the circuit between the generator and battery at a little above idling speed and opens the circuit when the engine is idling or stopped. The cut-out consists of a shunt coil and a current coil wound in opposite directions on a soft iron core. A set of contact points on an armature plate above the coil is held open by a spring.

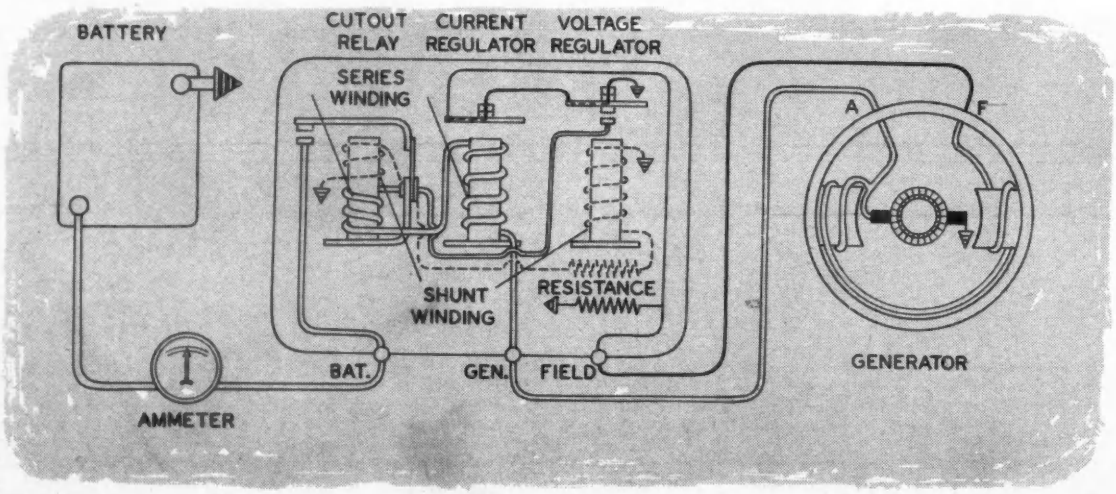
As the generator begins to operate, all the current passes through the shunt winding to the ground. As speed increases, current flow through the coil increases until it creates a magnetic field of sufficient strength to overcome the armature spring tension and close the points, thereby completing the circuit.

Reduced charging rate allows current flow from the battery through the current coil. This current, being an opposite direction, counteracts the magnetic field created by the shunt coil. The reduced magnetic attraction allows the armature spring to open the contact points, breaking the circuit. This prevents battery discharge through the generator to the ground.

The amount of current produced by the generator armature is in direct proportion to the strength of the magnetic field through which the armature loops rotate. The generator output is controlled by regulating the current flow through the field coils which produce this magnetic field. Fig. 5.

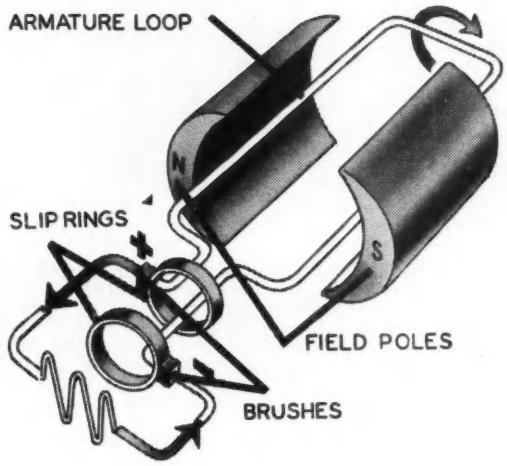
Voltage and current regulators are magnetic switches which control current flow to the generator field coils by automatically switching resistance in or out of the field coil circuit. This in turn reduces or increases the strength of the magnetic field. When the battery is low, resistance is switched out of the circuit allowing the generator to charge the battery. As the battery becomes charged, resistance is switched into the circuit, cutting the strength of the magnetic field and reducing the charging rate.

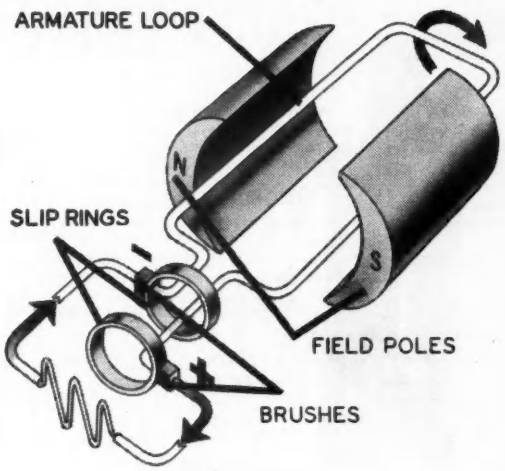
In the voltage regulator, the points are closed when the generator is not operating. When the generator output voltage reaches the regulator setting, the points are pulled open by the magnetic attraction of the



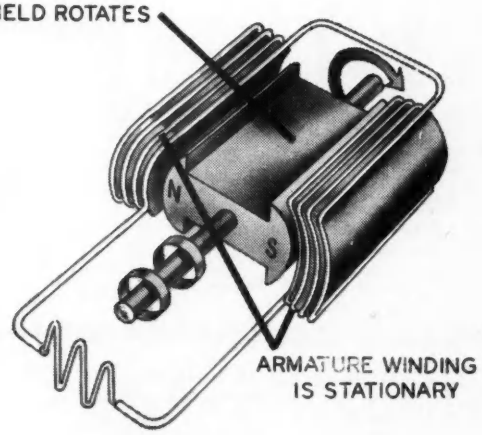
6 & 7 This is an AC generator, or alternator, as used on some of the newer cars. You will note that the brushes bear on solid slip rings and that the current changes directions as the loop rotates.

Why an AC generator when we need DC current? The power requirements of modern cars are getting beyond the capability of the brushes to pick up current through a sliding contact without arcing. So how about the slip rings?





8 Since the current in an AC generator doesn't require switching during each revolution, the armature winding can be on the outside and stationary. All that rotates in this type of generator is the magnetic field, and this requires only a small energizing current through the brushes and slip rings. DC current for the battery circuit is obtained by using a selenium or silicon diode rectifier which allows current flow in one direction only for this purpose.



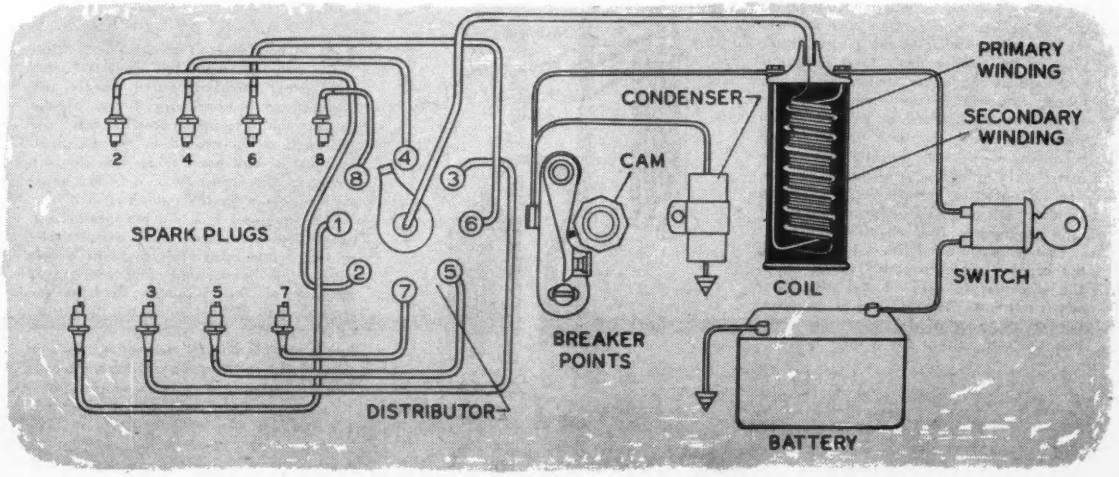
coil. This forces the generator field current to flow through a resistance to reach ground. The resistance lowers the field current which in turn lowers the generator output.

The diagram at left illustrates a Delco-Remy unit with double contacts on the voltage regulator. The upper set of points operates as in any other voltage regulator, and the lower set acts as a "safety." If the conventional circuit fails to regulate the voltage to a predetermined level, the lower points close and short circuit the field coils.

The current regulator controls generator amperage output and is similar in construction to the voltage regulator.

10 The automotive ignition system has two electrical circuits: 1) The primary or low tension circuit. 2) The secondary or high tension circuit.

The low tension circuit operates at battery voltage and includes the ignition switch, primary coil windings, distributor points and the condenser. The high tension circuit includes the secondary coil winding, distributor rotor and spark plugs.



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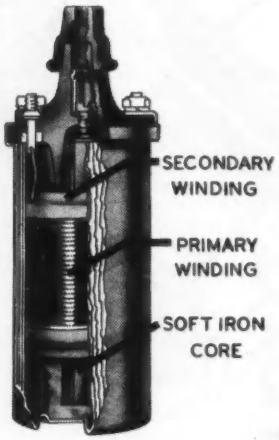
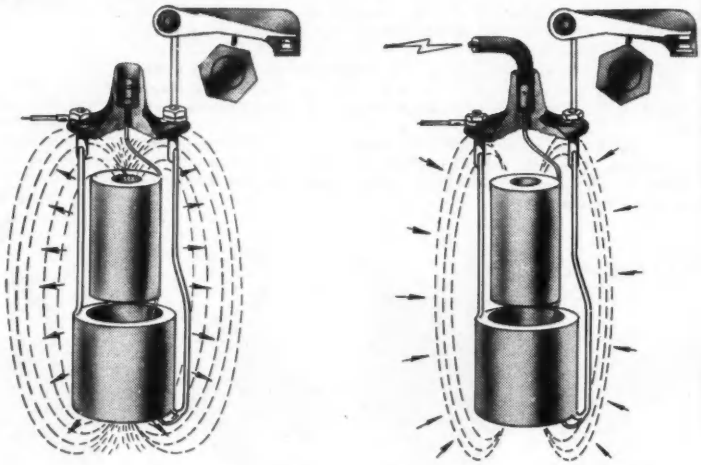
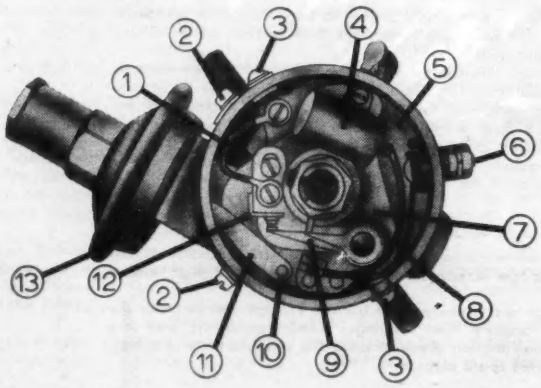


11 The ignition coil is a transformer that boosts the input voltage to the level required to jump the spark plug gap under cylinder compression pressure. This transformer consists basically of a concentric primary and secondary coil wound around a soft iron core.



12 & 13 The primary winding in the ignition coil is energized by a current flowing from the ignition switch to ground through the distributor points. The secondary winding consists of a great many more turns of finer wire than the primary. One end is hooked to the ground terminal on the coil and the other to the high tension lead to the distributor. The primary winding builds up a magnetic field around the two windings when it is energized. When the points are opened, the current flow stops and this magnetic field collapses. As the lines of force of the collapsing field cross the secondary windings, they induce a momentary surge of current in the secondary windings.



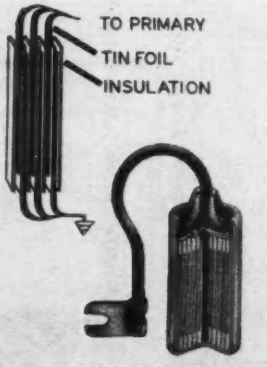
15 This is a view looking into the low tension level of a typical six-cylinder distributor with a vacuum advance mechanism. The various parts are identified as follows:

1. Ground wire. 2. Vacuum advance attaching screws. 3. Cap clip screws. 4. Condenser. 5. Support plate. 6. Primary terminal stud. 7. Breaker plate. 8. Primary conductor to the points. 9. Contact arm with fiber rubbing block. 10. Breaker cam. 11. Vacuum advance actuating link. 12. Contact plate. 13. Vacuum advance diaphragm housing.

The ignition distributor performs three important functions: 1) It opens and closes the points in the primary circuit. 2) It distributes the high tension current from the secondary circuit to the proper spark plug at the proper time. 3) It advances and retards the spark timing as engine speed increases or decreases.

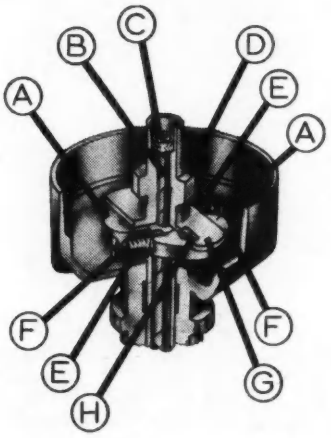
The distributor is driven at half crankshaft speed by camshaft or oil pump drive to coincide with the alternate stroke firing cycle in a four-stroke-cycle engine. The advance and retard feature of the distributor is necessitated by the length of time required to burn the fuel charge.

Timing advance is achieved by rotating the breaker plate assembly in an opposite direction to that of the distributor cam rotation. Timing retard requires breaker plate rotation in the same direction the cam rotates for a later spark.



14 A condenser is composed of alternate sheets of foil insulated from each other. Odd-numbered sheets are attached to the primary circuit at the points, the even-numbered sheets are grounded as illustrated in the diagram. In modern condensers these elements are arranged concentrically in a round housing, as shown by the cutaway.

The condenser has two purposes: 1) To absorb the current of the primary circuit as the points open. This prevents arcing across the points and facilitates rapid collapse of the magnetic field in the ignition coil. 2) The condenser discharges back into the primary circuit in an oscillating manner and de-magnetizes the iron core of the coil to prepare it for the next ignition cycle.



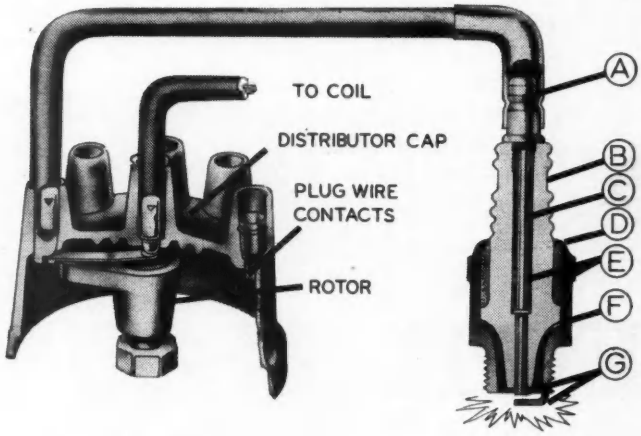
16 Advance and retard are automatic, the actuation being by means of a diaphragm operated by manifold vacuum, centrifugal weights operating against a cam, or a combination of both. A vacuum advance mechanism is visible in Fig. 15. In Fig. 16, we see the parts of a centrifugal advance mechanism as follows:

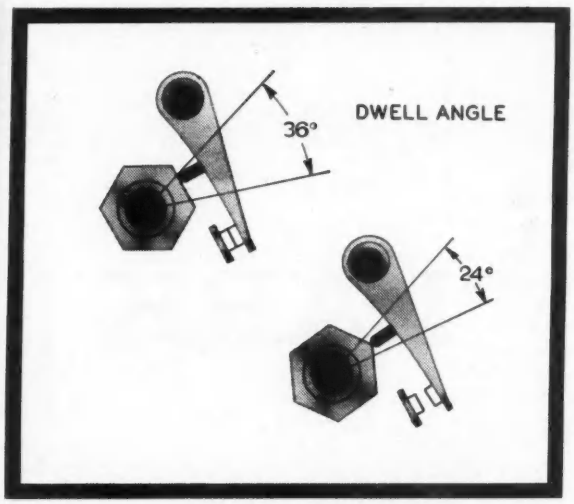
A Centrifugal weight.
B Distributor shaft.
C Lubricating wick.
D Breaker cam assembly.
E Weight return spring.
F Advance adjusting bracket.
G Stop plate.
H Stop plate control slot.

17 The current of the secondary circuit is distributed to each individual spark plug by the distributor rotor. This is an insulated arm with a spring contact plate on top which bears against a contact in the center of the distributor cap. A current conducting bar on the rotor aligns with each plug wire contact in turn and the high tension current jumps the gap on its way to the spark plug.

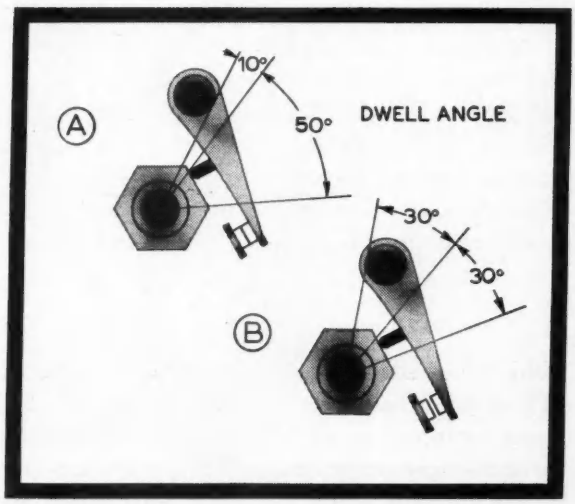
The spark in the combustion chamber is between an insulated electrode and ground in the engine cylinder head. For convenience and to facilitate changing when required, these two electrodes are incorporated in a removable spark plug. A cross-section of a typical two-electrode spark plug shows its construction: A. High tension terminal. B. Insulator. D. Shell. E. Sealing material. F. Copper sealing ring. C. & G. Electrodes.

Probably the most important single factor in spark timing is proper point setting. Magnetic field buildup in the ignition coil is considerably slower than the collapse of the field, so sufficient time must be allowed for this buildup. Since the primary circuit is fed through the distributor points, the duration of time they remain closed is important. This is called "dwell" and the number of degrees of rotation by the cam while the points are closed is called "dwell angle." For proper action, the points must open far enough to provide a clean break in the primary circuit, so angle of rotation while the points are open is also important.





18 The cam angle varies on different cars, so for demonstration of the importance of point setting, we will use a somewhat average figure of 36 degrees cam angle (dwell) and 24 degrees of cam rotation while the points are open. This will represent the proper point setting.



19 A. In this illustration the points are set too wide, the dwell angle is too large, points closed too long and the spark is late. B. If the dwell angle is too small, the points open too soon and the spark is early. This happens if points are set too close.

NEW

ENGINE

FOR THE

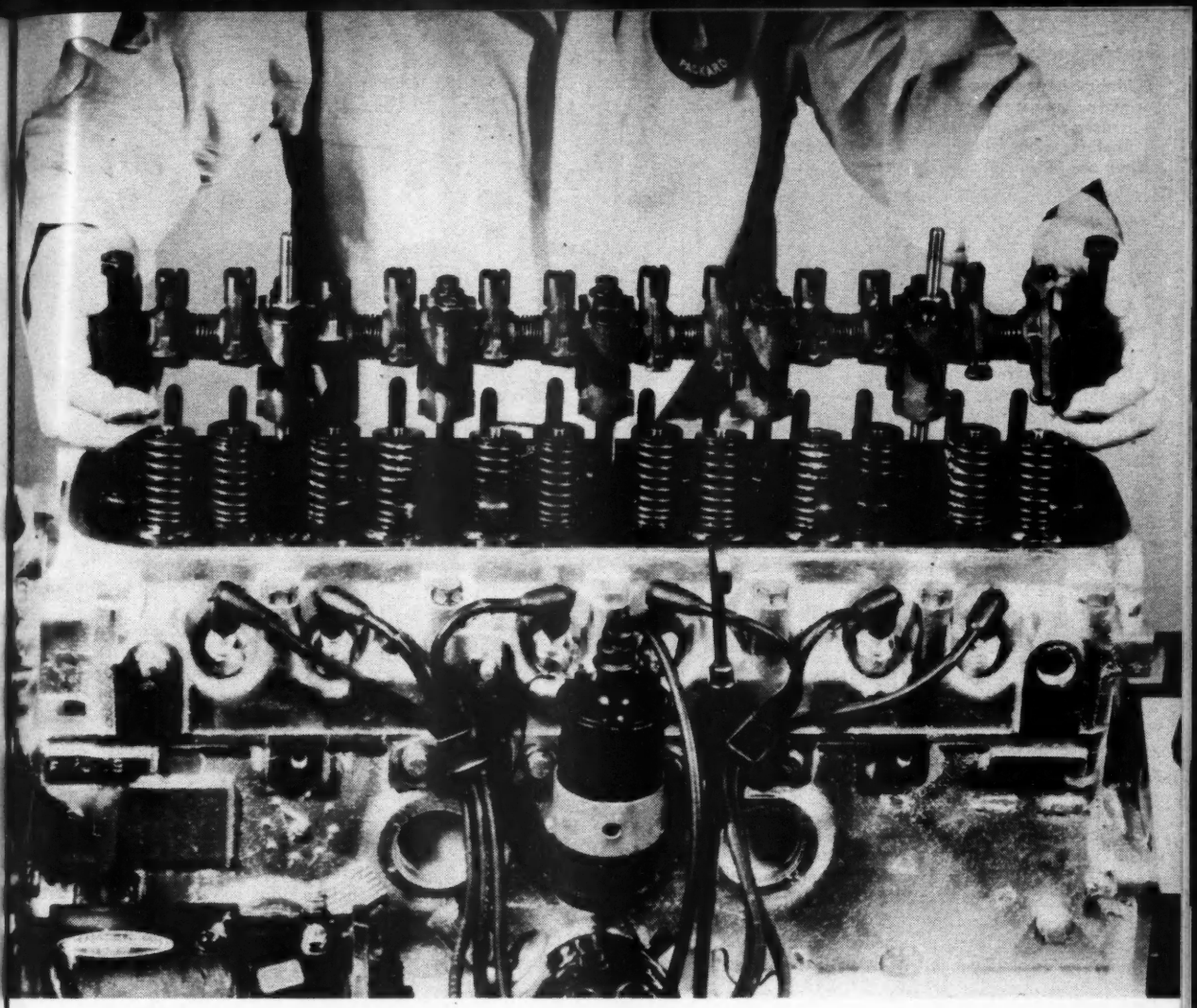
STUDEBAKER ENGINEERS

LARK

In the two years the Studebaker Lark has been out of the nest, it has been somewhat crippled by what critics call "an old-fashioned engine." Despite good materials, workmanship and engineering, sales of the little compact just did not set the automotive world on fire. But this year things are different. Recognizing the limitations and disadvantages of the old powerplant, Studebaker engineers put their talents into motion and they have come up with a new and more powerful engine for the [illegible] Lark. It is a modern 170-cubic-inch overhead valve six-cylinder engine, and holds out a promise for more economical performance with a quieter and smoother operation. Replacing the L-head power source which has been around Studebaker for many years, the new Six develops 112 hp at 4000 rpm with a compression ratio of 8.5-to-1. This increase compares with the 8.3-to-1 ratio and 90 hp at 4000 rpm for the original flathead engine.

Studebaker design engineers, highly respected for their innovations despite having less money than their Detroit counterparts, have again proved their prowess by adapting the veteran L-head into the greater horsepower of the ohv. The job is reminiscent of the days when auto enthusiasts modified their four-cylinder heads which they adapted to the basic block assembly. These heads had certain limitations of space and layout imposed upon them, particularly since the L-heads were never designed for such adaptions.

Facing this same problem with their Six, Studebaker technicians boldly made their redesign changes, yet were able to keep the basic block and its dimensions. But they were not satisfied to just fit the new overhead assembly to the



UP COMES THE ROCKER ASSEMBLY FROM STUDEBAKER'S NEW OHV SIX. EXHAUST VALVE ANGLING MAKES 12 IDENTICAL ROCKERS POSSIBLE.

HAVE BROUGHT THEIR SIX-CYLINDER POWERPLANT UP TO DATE

old block; they wanted to try something different. By employing some clever techniques in modifying the block assembly, the engineers did not retain a single feature of the flathead, except for the valve doors located in the side of the block. Valve pockets and intake and exhaust ports have all disappeared under the engineers' drawing board. Retention of the valve doors, however, is considered an advantage, particularly if lifter removal and replacement are ever desired without removing the cylinder head.

This new engine is designed to produce maximum power, without additional and unnecessary weight. Studebaker accomplished this by using larger valves, but since the engine has a smaller bore (three inches) than most of today's ohv V-8 engines, the engineers faced quite a problem obtaining a combustion chamber configuration that would allow the large valve area despite the small bore. They solved this by staggering the valve positions, and designing a kidney-shaped chamber. This chamber has an ample quench area which provides a smoother operation during the combustion cycle and reduces detonation noise to a minimum. The cylinder head would have to be considerably longer or the valves smaller, if the valves were in a row, like they are in a majority of the V-8's. Since a longer head is impossible, and the smaller valves are undesirable, the staggered layout and odd-shaped chamber solved the puzzle.

Another innovation of the new Six is the camshaft, with a long-ramp and low-acceleration cam, and which has been utilized in Studebaker V-8 engines. The low-acceleration cam does not mean low acceleration of the automobile, instead it refers to the valve train which is accelerated slowly. This means that valves open and close more slowly, instead of being quickly opened and then slammed shut. The cam, with its gentle action, allows the installation of lighter valve springs which helps prevent wear.

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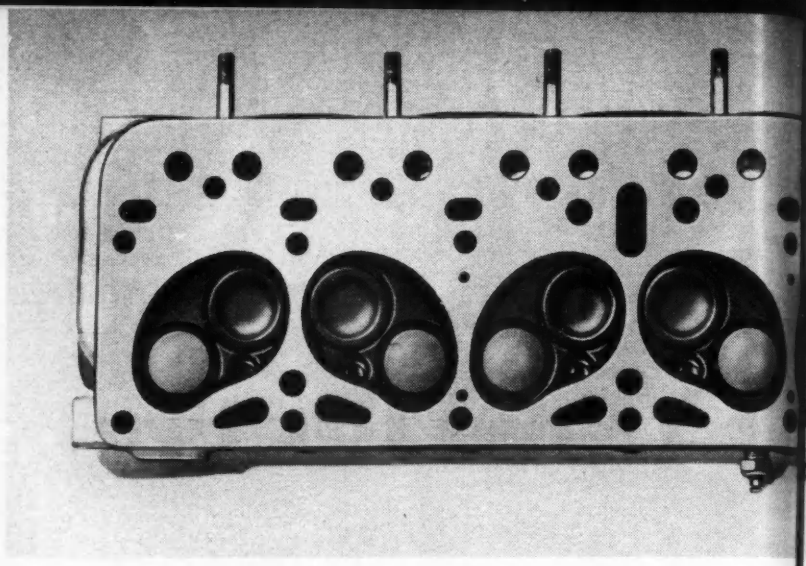


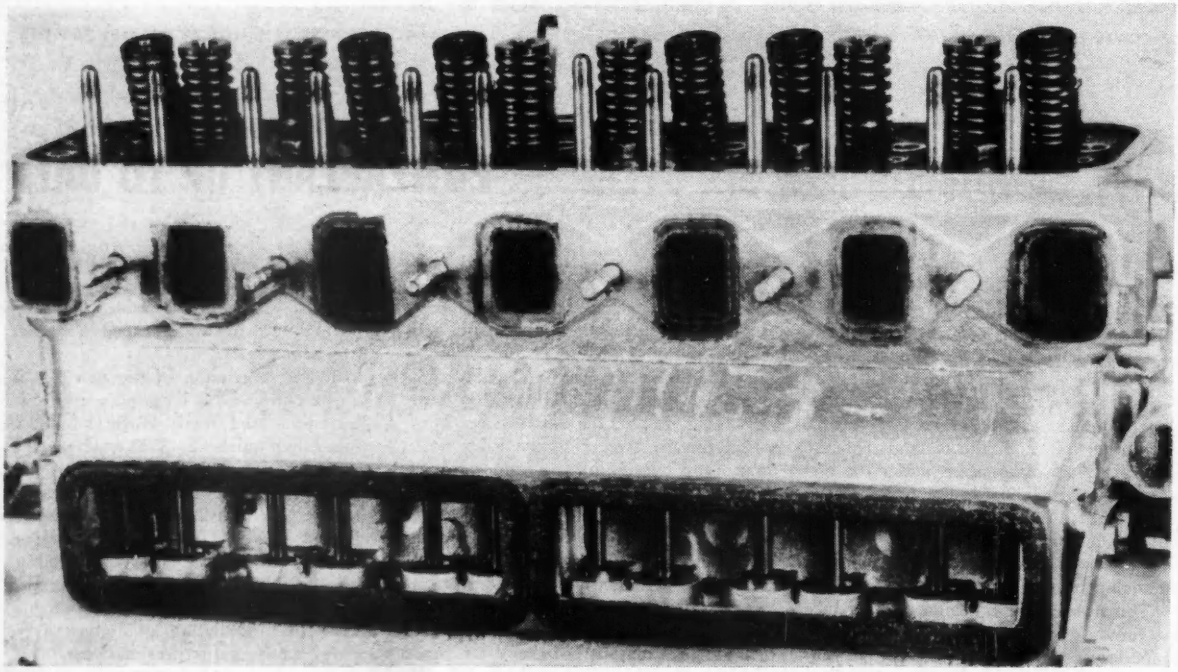
Kidney-shaped chambers and staggered valve layout give much greater valve area for this three-inch bore engine than if valves were placed in a row as they are in the normal V-8 powerplant.

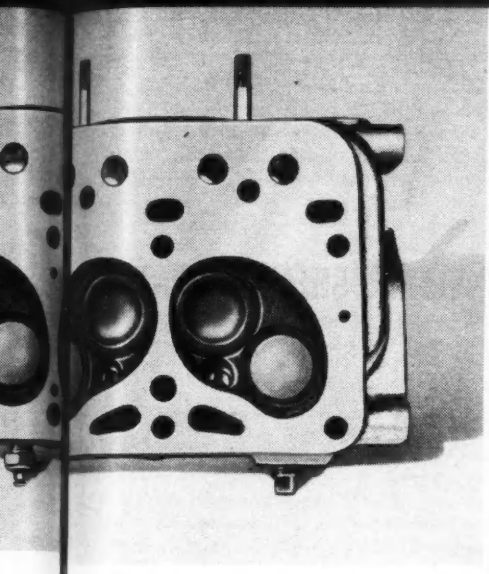
NEW ENGINE FOR THE LARK

With the given 8.5-to-1 compression and a peak torque of 154 lbs.-ft. at 2000 rpm, the cam itself can be considered as a short timing cam. This will be a big aid in economy over the L-head engine, and, because of the overhead configuration, fuel consumption of the new Six should be considerably less than last year's model. From a straight economy standpoint, the ohv Six should outclass its big companion, the V-8, by a wide margin. This is particularly good news since it was not uncommon in the past for the Lark V-8 to obtain better mileage than its smaller stablemate, the Six. For example, during the 1960 Mobilgas Economy Run, the V-8 obtained nearly two miles per gallon more than the Six. With the new Six, Studebaker plans to give the popular Rambler a run for the economy crown. Its three-inch bore and four-inch stroke will add to the economy column, and it has been designed to operate efficiently on regular gasoline.

Another new feature is a high capacity oil pump that will increase the automobile's lubrication flow. A new fully counterweighted crankshaft is another addition to the new powerplant. It will provide better engine balance and reduces driveline vibrations. The new Lark will feature a larger clutch—9⅛ inches—as opposed to the eight-inch clutch on earlier Six models. Installation of timing gears, which have been found to be more positive than timing chains, have been made on the new engine, according to company officials.

A new-design recirculating ball-type steering gear, and change in caster from 2½ degrees negative to zero degrees, will greatly improve the general handling and steering characteristics of the new Lark. In addition, the knuckle upper bushing is a new type and is precision-ground to reduce friction. As a result of these changes, steering efforts have been reduced by 30 per cent on six-cylinder models, and by 10 per cent on the eight-cylinder models. Steering response, directional stability and recovery after turns have all been improved. For the first time, power steering is available on all Lark Six models for 1961.





In addition to the conventional and overdrive transmissions, the 1961 Lark will have an optional new automatic transmission and a new converter available. This new transmission incorporates many modern features including a one-way clutch that will provide smoother shifting characteristics. All Lark models with automatic transmissions will have an underhood oil filler tube.

The brake master cylinder has been mounted on the fire wall in the engine compartment for greater ease in servicing. Other standard features for the new models include combination air cleaners and silencers, Butyl engine mountings, heavy-duty crankshafts, "heat dam" pistons and automatic chokes. A wide choice of rear axle ratios provides for top performance in any type of terrain.

Of particular interest to all Southern California motorists is a forced crankcase ventilation system to reduce smog-producing fumes.

Gasoline fumes that escape past the rings in the cylinders are piped to the intake manifold to be burned in the cylinders. All Larks delivered to California will come equipped with this anti-smog device, while it will be available on special order for customers residing in other states.

With its new, more powerful, and yet more economical, ohv Six powerplant, plus the many new improvements, backed by years of solid engineering skill, the 1961 Studebaker Lark is on the move to capture a much larger share of the compact market. The Lark is not planned as a hot rod, yet with the new Six, it should be a zippy, economical, fun car, with long-lasting quality components. /MT

Head has three large intake ports and four exhaust ports. Valve door openings in block were for tappet adjustment of the old engine but are retained in new design for access to lifters.

DIRTY SLUDGE DID THIS DIRTY WORK: Sludge clogged this oil intake, preventing oil from circulating. Result: engine wear, poor mileage, finally a major overhaul. That's why you . . .

ADD BARDAHL

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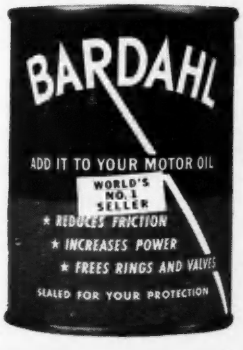

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THE DKW 750 is a fascinating example of highly successful solutions to the problems inherent in small car design. It is small—85.6-inch wheelbase—yet it holds four adults and a surprisingly large quantity of luggage. Even though the three-cylinder, two-cycle engine drives the front wheels the disadvantages normally associated with this system—hard steering, universal joint thumping—have been largely engineered out. Performance and economy are as good or better than other cars in its size and price class. Finally, the consensus is that the 750 is one of the most attractive small cars on the road; it looks a great deal

BENEATH ITS NEW BUT CONVENTIONAL SHELL OPERATE

DKW 750

larger than it really is and the appearance is sufficiently Americanized (or just well designed) so that it doesn't take any getting used to as do some of the bizarre styles.

Of particular interest is the 45.2-cubic-inch two-stroke engine. DKW has been building various sizes of automotive two-cycles for 32 years and they have the technique perfected. Yet, the principle has never caught on here for automobiles, apparently because of a consumer reluctance to add oil into the gasoline tank each time fuel is taken on. Adding a pint of 30 weight non-detergent oil for five gallons of gas can be inconvenient simply because many service stations no longer carry bulk oil. This means that a quart can must be opened and half of it left behind. The alternative is to run the tank to nearly empty, adding a quart of oil and 10 gallons of gas.

There is no reason to doubt that as more motorists are introduced to the two-stroke this negative attitude will change, and this is good because the engine offers long life, economy of operation and minimum upkeep. All that is required is that the owner become accustomed to an idle that has been compared to the irregular noise of a popcorn popper, lack of engine braking on deceleration and a moment's warm-up before take-off. It should be emphasized that the lack of camshaft, valve train and related moving parts, plus the fact that the DKW uses a high-quality roller bearing crankshaft, serve to make this two-stroke a desirable powerplant.

The 39 horses (SAE rating) that the tiny engine puts out at 4400 rpm move the 750 along at a brisk clip. There is never any particular strain on the engine and it revs freely up to a high-pitched hum. In fact, the car would be traveling almost 100 mph before reaching the theoretical piston speed limit of 2500 feet per minute. A true top speed is 72 mph—and that takes some doing to get there. There is enough acceleration at the lower end to stay with traffic as long as the driver is willing to stand on the accelerator pedal in the first three gears. The column shift controls four all-synchro gears which helps when one wants to slip into first gear while rolling slowly. Unlike the larger DKWs and Auto Unions, the 750 uses a standard H pattern shift that seems slightly cockeyed because 1st and 3rd are nearly straight up.

SOME OF THE AUTO WORLD'S MOST CONTROVERSIAL COMPONENTS

Acceleration figures of cars in this weight and horsepower class are always affected by a passenger and the 750 runs true to form. The figures as recorded in the data box were taken with driver and passenger. A second set with driver only revealed considerable improvement—.8 of a second better to 30 mph and 1.9 seconds faster to 45, while the standing quarter-mile at 54 mph was a full three mph faster than with two persons aboard.

Traditionally, front-wheel-drive cars are supposed to be able to corner faster because of being pulled rather than pushed through turns. While this is not strictly true, the DKW gives the feeling of cornering rapidly and very safely. It sails around sharp bends at high speeds with very little body roll. Gentle but steady wheel pressure holds the line through the turn while the rear wheels do not feel as though they want to swing out and forward as in an oversteer condition. There is some kick-back in the steering wheel when accelerating hard and cornering simultaneously, and there is a definite torque reaction which pulls the wheel to the left under full straight line acceleration. Under normal conditions steering is noticeably light in spite of 61 per cent of the weight on the front wheels. And it is quick—2.2 turns, lock-to-lock.

Because of the 750's relative lightness, brakes are more than adequate. Front brakes are placed inboard next to the differential housing where they become part of the sprung weight. They are not easy to reach and could contribute to one of the car's few service problems.

It is a vague quality called "ride" that concerns most car owners and in the case of the DKW 750 it is quite acceptable.

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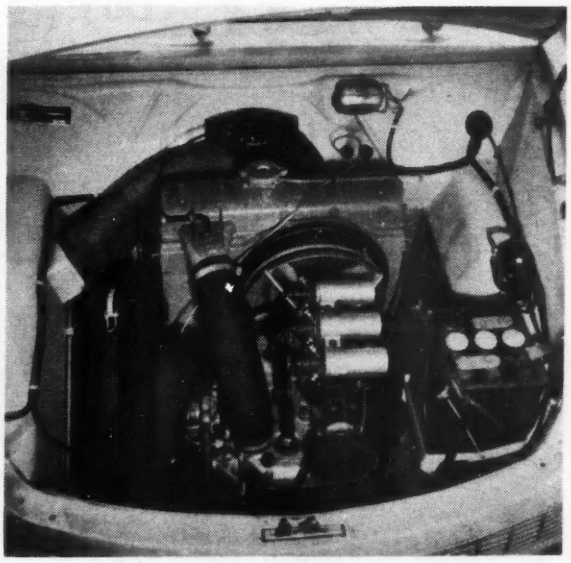
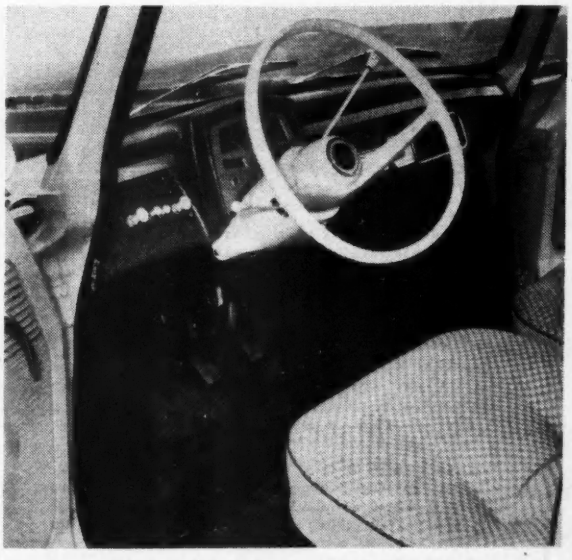


Three-cylinder, two-cycle engine of the DKW requires new techniques of the American driver. He must become used to front-wheel drive, low engine braking on deceleration.



Interior finish of the little German sedan is functional and comfortable. Note how the steering wheel has been flattened on the bottom to allow greater thigh clearance.

MT | ROAD TEST DKW 750

Test Car

TEST CAR: DKW 750
BODY TYPE: 2-door sedan
BASE PRICE: $1699 (West Coast p.o.e.)

Maneuverability Factors

OVERALL LENGTH: 156.1 inches
OVERALL WIDTH: 62.2 inches
OVERALL HEIGHT: 55.1 inches
WHEELBASE: 85.6 inches
TREAD, FRONT/REAR: 46.5 and 47.2 inches
TEST WEIGHT: 1380 lbs.
WEIGHT DISTRIBUTION: 61 per cent on front wheels
STEERING: 2.2 turns lock-to-lock
TURNING CIRCLE: 33 feet curb-to-curb
GROUND CLEARANCE: 7 inches

Interior Room

SEATING CAPACITY: four to five
FRONT SEAT
HEADROOM: 35 inches
WIDTH: 21.5 inches each seat
LEGROOM: 41 inches
TRUNK CAPACITY: 14.9 cubic feet

Engine and Drive Train

TYPE: 3 cyl., 2 cycle
DISPLACEMENT: 45.2 cubic inches
BORE & STROKE: 2.68 x 2.68
COMPRESSION RATIO: 8-to-1
CARBURETION: 1 single-barrel
HORSEPOWER: 39 @ 4400 rpm
TORQUE: 47 @ 2500 rpm
TRANSMISSION: 4-speed, all-synchro
REAR AXLE RATIO: 3.87 to 1

Performance

GAS MILEAGE: 26 to 32 miles per gallon
ACCELERATION: 0-30 mph in 8.3 seconds, 0-45 mph in 17.5 seconds and 0-60 mph in 41.4 seconds
SPEEDOMETER ERROR: indicated 30, 45 and 60 mph are actual 31, 46 and 50 mph respectively
POWER-WEIGHT RATIO: 35.4 lbs. per horsepower
HORSEPOWER PER CUBIC INCH: .86

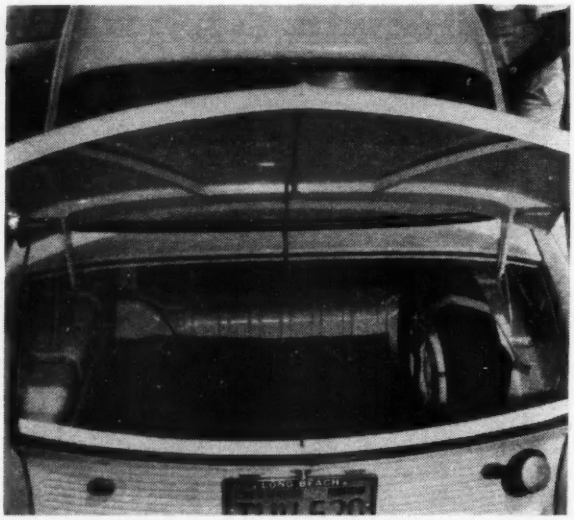
Front suspension is independent with A-arms and torsion bars; at the rear a solid dead axle is suspended by a pair of trailing arms that actuate torsion bars. Road bumps are soaked up, not quite smooth as silk but with considerably less pitch and bounce than seems possible for a small car. Insulation from road and engine noise is especially good. At high speeds with windows closed the engine and wind noise level is very low; open the windows and the noise increases slightly along with wind buffeting on the back of the neck. Front vent panes would be helpful, especially as the rear windows are fixed.

Finish and panel fit are in keeping with a high standard of quality in relation to the 750's price tag of $1700, meaning not perfect but far from shoddy. Sturdy cloth upholstery and headliner do not pretend to be something more expensive. In contrast, the dash is a peculiar molded fiberboard that has a sort of leather-grained effect that adds little to style or function.

The steering wheel is flattened on the bottom and gives one inch more thigh clearance on its bottom side than when it is cranked full over. Its position is a good compromise and visibility to the minimum instrument panel is satisfactory. Turn indicator is on the right side of the column and is not self-canceling but a dash flasher and click should alert all but totally unconscious drivers. On the left of the steering column is a convenient headlight flasher, often more useful than a horn for signaling other cars day or night.

No peculiar contortions are needed to slip through the wide doors into the individual front seats. From their front edge to the floor is 10.5 inches, making them nearly chair high and quite comfortable for long periods. Entering the rear seat is not quite as simple. Front seats pivot individually at the floor from their forward edges. A crouch and half-twist will get one through the remaining space into the back to enjoy somewhat limited knee room. The seat is wide enough for three but because the backrest padding ends about six inches from either side it better accommodates two adults. Trunk luggage area is spacious. A word of caution: The mat on the trunk floor is directly on the gas tank and sharp-cornered objects could damage the exposed gas gauge fittings.

The desirable qualities of the 750 place it with the best of the small economy sedans. And as American motorists are introduced to two-cycle motoring, the 750's bright future could become positively brilliant. /MT



Storage area is quite good for an import of this size. Gas filler pipe on right must also be used for the addition of oil into the fuel each time the tank is filled with gasoline.

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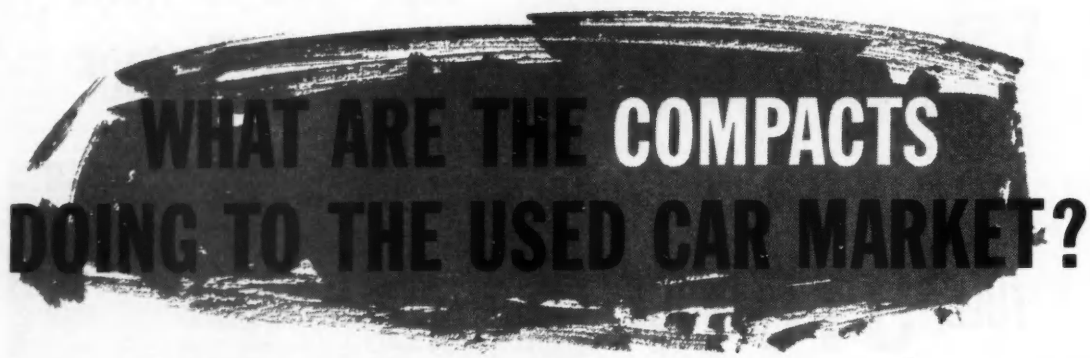
AS A CAR BUYER, YOU CAN BENEFIT FROM TODAY'S TOPSY-TURVY USED CAR PRICES

by James E. Potter



TO USE THE WORDS of one well-known auto dealer, "The trend is definite but confusing!" Prices on late-model ('58 and '59) used cars," he went on to say, "are extremely attractive for the prospective used-car buyer. Yet, our rather large stock of these low-mileage, well-kept cars are moving at a snail's pace. They just aren't selling!"

These words actually represent a consensus of the "blues" expressed by at least 10 new and used car dealers of domestic automobiles in one of the largest automobile trade centers in the world today. The cause of the glutting of the market and the consequent buyer's heyday, of course, is the advent of the domestic compacts. From a production standpoint, they've taken over 25 per cent of the 1960 model cars built, an increase numerically of better than 212 per cent from a year ago.

Boiled down to essentials, the car buyer today is in an extremely advantageous position, caused by the uprooting of values by the public-demanded compacts.

Instead of boring statistics, let's take John Jones, the owner of a 1956 Buick sedan, who is finally able and willing to purchase a later model or new car after completing his long-term payment plan on his old vehicle. Typically, he makes the rounds of several new car dealers to get a range on the value of his car. He discovers that the trade-in offers vary considerably, depending on the make and size of the new car he's looking at. For the big, so-called "standard"-size new cars in the medium-price range (Buicks, Oldsmobiles, Chryslers), he's offered roughly $200 more than on new cars in the low-price range (Fords, Chevys, Plymouths). Then, not to be different from any other person out looking for a bargain, he checks the new compacts (Comet, Corvair, Falcon, Lark, Rambler, and Valiant).

On the compacts, he's offered less on a trade-in due, of course, to the shorter dealer profit (about 20 per cent as against 25 per cent profit on the larger cars). Actual cash outpu., or the difference between his trade-in value and the cost of the new car, however, would be far less in the case of either the lower-priced cars or the compacts.

All this may not seem out of line from what would be generally expected, except for one thing: Jones finds that almost every dealer or salesman that he has talked to is very reluctant to "get excited" about *his* car. True, they're interested in selling him an automobile, but they're *not* interested in "buying" his, even though we're taking for granted for the purposes of this example that his car is in good shape.

Why is this? The simple fact of the situation is that today dealers are taking a bold chance on every car they take in trade. Used car prices throughout the country are not stable; on various makes and in certain areas prices are actually declining sharply, and stocks are piling up fast—not just used car stocks but new car stocks as well.

On top of this, dealers are finding that any car with more than a $1000 price tag on it simply isn't moving, except for some prestige or sportscars.

On his rounds, Jones discovers another thing: almost all the new car dealers he visits have an overwhelming inventory in late-model (1958 and 1959) big cars, and in nearly every case the dealers had taken particular pains to see that these cars were in better-than-average condition. Appearance-wise, these late-model cars look just about as good as those brand-new machines under the floodlights of the showroom floor, yet for some reason not immediately discernible to a non-expert like Jones, these cars are going begging.

An explanation that seems quite reasonable was expressed by a new car dealer who was quite articulate on his problems. "You take a 1959 four-door sedan that originally sold for around $3200," he was saying. "It should fetch $2650 on my used car lot this year. But will it?

"For a buyer to become interested in a $2650 used car, the deal must be attractive from a financing standpoint. Most lending agencies want one-fourth to one-third down and the balance paid in no more than 24 months. Many of my customers apparently are settling for a new compact car that costs $2500 or less and on which they can pay almost any amount down and get 36 months and up to pay off the balance. In addition, of course, they get a new-car guarantee.

"So what do I do? I have to offer several

hundred dollars less than the $2650 that I would have offered for a one-year-old car a year or so ago. My prospect for a new car (I don't handle compacts—yet) gets in his present vehicle and rolls away."

According to our research, the above example is happening more often than in just isolated cases. There's enough *should-be* buyers doing this, it is felt, to affect new car sales, despite the fact that new car sales are ahead of last year by about 14 per cent. Used car sales, on the other hand, are just barely ahead of last year.

An analysis of these facts probably means this: there are more new cars than usual, probably compacts, that are being sold without a trade-in. Used-car stocks are up (an inventory of better than 100,000 over last year has been reported), a definite indication that more second-car buyers are going for compacts rather than used cars.

What does all this mean to the prospective car buyer—new or used? If he's a *yearly* new car buyer, he won't realize as much for his trade-in this year as he did last, unless he's lucky enough to catch a dealer who isn't up on the situation and is still offering "normal" trade-in values on his year-old car. If the car buyer has a two-, or three-, or four-year-old car to trade in on a new car, unless his car is in immaculate condition, he'll find that new car dealers, for the most part, will try to hedge as long as they can (until they get your name on the dotted line) on the used-car allowance. And, it'll be lower than you expected unless you're on your toes.

If you're a used-car buyer, you're better off than you've ever been, especially since the 1958 and 1959 models are bulging (literally) out of the used car lots everywhere. You'll find nearly spotless vehicles with plenty of extras at extremely good prices, this because the dealers are going to have to move them to make room for the incoming trade-ins on the 1961 models. It may be to your advantage (if you want luxury and sheer bulk and perhaps prestige) to buy a '59 or '60 used car in the medium-price range, but you probably will be in a class of car owner that is showing every indication of being on the declining side—for tomorrow's automobile from the domestic Detroit whirlpool will be on the small, compact side.

Yes, the compacts have stirred up the used car market but good. They've also stirred up things in the new car market. We'd venture to say that you'll follow the pack, for the trend towards compacts is definite, though, of course, there will always be some people who will still want to drive larger and heavier cars. If you're one of the latter, you'll be able to do so at a cheaper price than ever before. That's the way the market is, and you might as well take advantage of it. /MT

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A monthly summary of the latest foreign car news from our overseas correspondents

AROUND THE WORLD IN 30 DAYS

FERRARI HAS LAUNCHED A new version of his famous 250-GT with two main seats and two occasional seats. All previous models have had two seats. By moving the engine and gearbox forward, he has obtained the extra interior space without increasing the length or wheelbase.

The low drag body form incorporates a slightly smaller radiator grille than the other models, and a smooth hood, without an air intake, is shaped to a profile which is designed to prevent lift and increase road adherence at high speeds. Fog and spotlights are set in the radiator.

The two-door body, designed by Pinin Farina, is of the severe, simple style with no irrelevant decoration. An almost unbroken expanse of glass gives excellent all-around vision. The roof line extends slightly over the rear window to give adequate head room in the rear seats, and the curved rear quarters blend into a new high tail which gives more luggage space than on the previous models. Rear seats have side and center arm rests, and an air intake below the windshield feeds fresh warm or cold air to the interior. The side windows drop and the rear quarter lights are hinged.

The engine is the well-known V-12 (73 x 58.8mm) 2953cc. It has three twin-choke carburetors and produces 235 bhp at 7000 rpm on an 8.8-to-1 compression. Transmission is by a four-speed synchromesh gearbox and a Laycock overdrive is offered for the first time. Dunlop disc brakes are installed on all four of the center-lock wire wheels which carry 6.50-15 tires. Curb weight of the new automobile is 2820 pounds.—**G.W.**

* * *

THE PRODUCTION PROGRAM of Volvo Automobile Company has been curtailed, according to the firm's officials. Reason for the cutback is in part due to a shortage of workers in the engine and gearbox plants, part to the increased sales of compact cars in the U.S. cutting Volvo sales; and in part to a boycott in South Africa. With the latter, Sweden has had a boycott against South African products as a protest against the apartheid policy of the South African government. South Africa's latest action, then, can be termed a protest against a protest.

Volvo officials state, however, that sales have increased in other parts of the world. Switzerland, for instance, has boosted sales 100 per cent.

The firm announced that they'll fight for a better share of the American market by reducing prices and bringing out a simplified version of the 544 model. The new price has not been released to the public.

* * *

A new fiberglass body, with long, low, racy sportscar lines, is becoming quite popular in Sweden. Called the "Carina," the shell is made by Swedish Plastic Cars, Inc. The body is available as a two- or four-seater, and a removable hard top is optional at extra cost. Rear fenders can be had with or without tail fins.

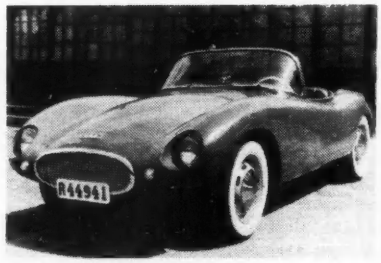
A body shell costs $320, and with doors, hood and trunk lid cut out and finished, the price ends up at $390.

The body fits all cars with a wheelbase of 90 to 110 inches, and many different family cars have been converted into a Carina sports roadster. The most popular cars being converted are Volvos and Volkswagens.—**Lars-Erik Johannson**

* * *

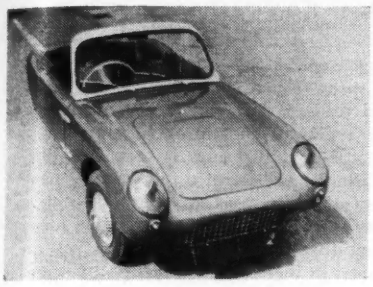
INCREASED REAR SEAT accommodation is the principal modification of the new deluxe version of the Berkeley Three-Wheeler. Introduced in September 1959 by Berkeley Cars Limited, Biggleswade, more than 1700 of these spirited little cars have been sold.

In addition to the enlarged rear seat, the windshield has been redesigned to give better visibility, and a larger hood has been provided. A heavy-duty front suspension has been incorporated, and a reinforced rear suspension incorporates a larger spring shock absorber unit and enables a lower sitting position to be



Smart styling highlights this fiberglass body shell that is made in Sweden. Called the Carina, the shell fits most cars. In this case, an A.U. 1000 (DKW) is all dressed up with the new body. Price of the shell runs just under $400.

Here is a new version of the famous Ferrari 250 GT. It has two main seats and two occasional seats, and increased interior space. The simple, clean design was drawn by Pinin Farina. The engine is the V-12, 2953 cc powerplant.



Berkeley Cars recently introduced its newly designed, deluxe three-wheel car. Increased space in the rear seat tops the main changes from previous models. Powered by an Excelsior 328 cc twin cylinder engine, and with front-wheel drive, fuel consumption of 60 miles per gallon is claimed.

provided. The body is constructed of molded glass fiber. Wheel discs are included as standard equipment.

The little three-wheeler is powered by an Excelsior 328cc twin-cylinder engine and the drive is to the front wheels. Top speed is said to be 55 to 60 miles per hour and the manufacturer claims fuel consumption of 60 miles per gallon. Price of the deluxe model is about $1275, while the standard model runs at $1197.

* * *

A GIANT STEP FORWARD in safe motoring has been announced by Dunlop Tire Company of England. Instead of the normal natural rubber tires, Dunlop has developed a new, synthetic rubber tire that cuts skidding and increases road-holding. Ordinary rubber is springy; it bounces if dropped and snaps back to its normal shape after it has been compressed. The new rubber is rather "dead"; it absorbs shocks without reacting so sharply and therefore grips better in bad conditions. Road-holding is increased 24 per cent, and wheelspin resistance is 45 per cent higher.

In addition, the synthetic rubber tire is quieter—with much less squeal during long runs on smooth traffic-polished roads. Yet, it has some disadvantages. Since it does not bounce, synthetic rubber soaks up heat during high speeds, and heat is the great enemy of tires. So that this new tire, to be known as RS 5 Elite, is not advisable for use with racing or high-speed cars.

The price at present is one-third higher than natural rubber tires, but with mass production, the cost is expected to be decreased.

For high-speed drivers, there is news of some improvements in tire design which should increase the accuracy of steering. For most drivers, a disturbing sensation is the sideways jerk as the edge of the tread strikes a streetcar track or ridge in the road surface. Most Continental manufacturers continue the tread around and over the edge and onto the wall of the tire, giving it a rounded shoulder. Dunlop and German technicians are now using a tire that has steps around the edge of the tire, so that it rides over the obstruction at speed without jerking the car.

With tire firms concentrating on specialization, Pirelli has its BS3 out that has a detachable tread, which can be changed for varying conditions.

* * *

THE SQUAT, STURDY appearance of the Miniminor and the Austin version, the Austin A-50, are already familiar on roads in many parts of the world. Since this is one of the most important small cars of recent years, I decided to give it a tough test through 10,000 miles.

Most of the time, during the test, the little car was driven flat out and it averaged 35.2 miles per gallon, while oil consumption is about one-half pint per 1000 miles. Although the car is small, it will keep on the go. In one 24-hour period, I covered 756 miles despite several stops for meals and a Channel crossing by boat. During this period it ran through snow, ice, fog and torrents of rain. *continued on next page*

This Jaguar XK 150 holds test curve at 39 miles per hour while driving on Dunlop's new synthetic tires, the RS 5 Elite. Tires increase road-holding and assist with braking on wet pavement.

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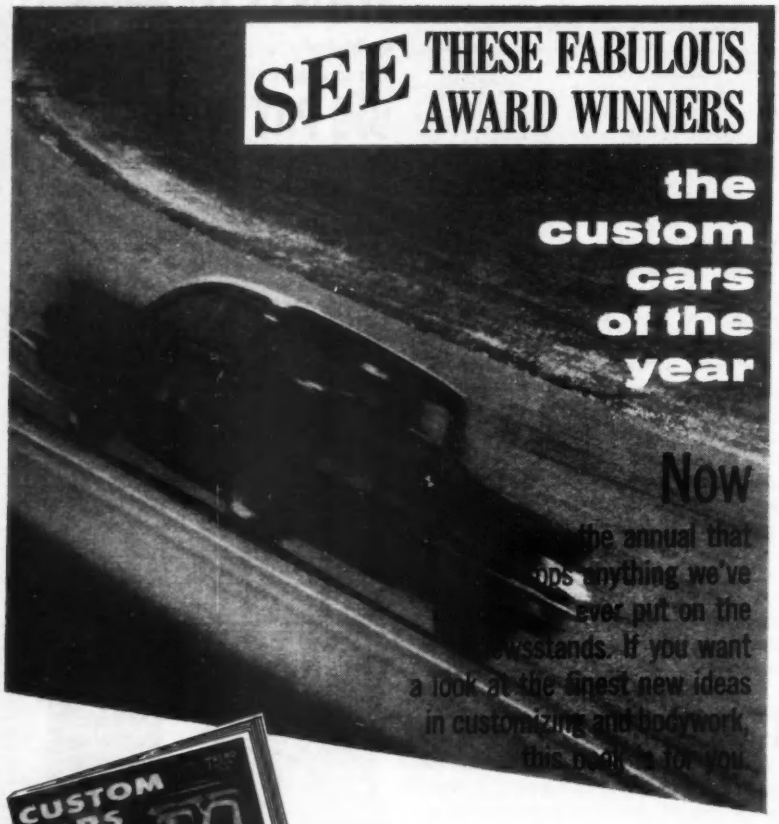
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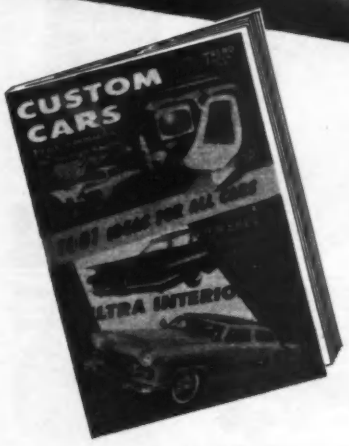

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The Miniminor has good road behavior, and with its independent rubber suspension, it rides serenely over all types of roads. When cornering fast, the front end tends to drift out at first, increasing the radius of the turn, but closing the throttle slightly brings it back into line. It handles well with a full load—I have carried as many as six persons—and is very safe on wet pavement. Unlike many front-drive cars, the Miniminor has no snatch in the steering, which is light and quick, 2¾ turns from lock-to-lock for a turning circle of 33 feet. Brakes are adequate and need only moderate pedal pressure.

The interior is roomy, particularly so for such a small car, the seat arrangements are comfortable and there is ample storage space on shelves at front and rear, in the doors, and in the trunk, which can take two big suitcases standing up and several small bags. Vision is good.

New standards are already being set by its performance: it accelerates from 0-30 mph in 6.3 sec.; 0-50 in 16.8; and 0-60 in 26.6 sec.

Interior trim and workmanship left something to be desired on this model, but subsequent units have been improved. The exterior paint appears to stand up well under adverse weather conditions.

At 6600 miles a sudden steering vibration was traced to a loose steering ball joint, which could have dropped off causing steering failure. The one on the other side also was loose and it seems that split pins are needed at these vital points, instead of self-locking nuts.

In wet weather, spray thrown up by big trucks can hit the distributor and cause misfiring, but this can be solved by smearing on silicon grease or installing a sheet metal baffle.

I had no trouble with the engine and it always started instantly, even after leaving it out during frosty nights. Engine and the accessories are readily accessible and all greasing points are easy to reach with a hand gun. The space-saving layout of transverse engine with gears in the sump does mean that extensive dismantling would be required to change engine bearings, but so far there is no suggestion this is needed.

Fast, nimble, thrifty and delightful to drive, the Miniminor emerged from the 10,000-mile test with fewer teething troubles than many other mass-produced cars. Given steady development and refinement, it should be a big seller for years to come.—**G.W.**

Spaciousness, both for passengers and luggage, is a feature of the small, sturdy Miniminor. The trunk alone will take two big suitcases and several smaller bags. The little automobile proved to be fast, nimble and dependable during a 10,000 mile test.

BETTER ROAD-HOLDING and brakes and improved appearance highlight the new version of the popular build-it-yourself Lotus Seven. In appearance the car is similar to previous models, but incorporates numerous detail improvements. Several items, formerly listed as optional, are now standard equipment without increasing the car's price. These include hood, spare wheel and windshield wipers.

Road-holding has been further improved by the fitting of 13-inch wheels, which reduce unsprung weight (previous wheels were 15-inch), by redesign of the rear suspension—in which lateral location of the rear axle is now provided by an A-bracket (previously by a Panhard rod), and by revision of spring rates. The nose cowl has been restyled in fiberglass, which has proven successful on the Elite and Grand Prix single seaters.

A more functional instrument panel is installed and extra space is provided in the foot-wells. Other improvements include a new braking system, with 8x1¼-inch front drums, and 7x1¼-inch rear drums, and a revised steering column layout.

The price in component form remains at $1761 for the Seven F with the Ford 100-E engine and gearbox, and $1833 for the Seven A, with a BMC A-series engine and gearbox.

* * *

NEW STYLING CHANGES, an improved power unit and new colors are all new features of the 1961 Vauxhall Victor. The most important appearance change is the new deeper window, which has an area of six square feet. Parking will be easier and the car's interior will be lighter. The window now sweeps right up to the roofline. The car has a crisp, easy-to-clean radiator grille, with the Vauxhall medallion in the center and a new Vauxhall nameplate above on the hood. The fluted chromium molding along the side is heavier, as well as the hub caps, which have a V-chevron on the Victor DeLuxe. The side trim has the word Victor on each front fender just above the wheels, while DeLuxe is imprinted on each front door. Headlight cowls have chrome-plated cappings.

Rear changes include a new turn-button lock built into the nameplate; the trunk now can be fastened without being locked. The lower part of the trunk lid now has a series of small vertical flutes to provide extra stiffness. Above these, on the DeLuxe and Super models, there is a horizontal plated molding.

There is a full-circle horn ring on the DeLuxe, Super and Estate Car models, and a new instrument panel and instrument layout on all models. The bold, red speedometer needle travels a 7¼-inch arc between zero and the maximum reading of 90 miles per hour. Also in the cluster

Better road-holding, brakes and appearance are the top features in the newly designed Lotus Seven. Price of this build-it-yourself automobile remains the same at $1761.

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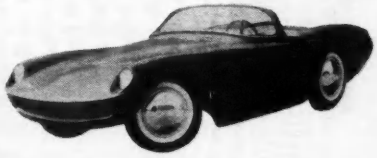

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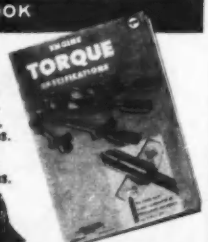

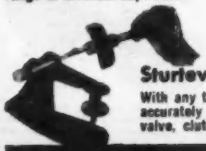

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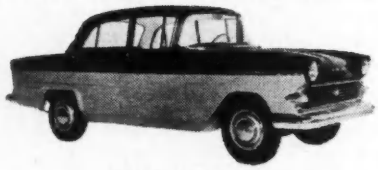
are temperature and fuel gauges, flanked by ignition and oil warning light, while the distance recorder shows through a small separate window.

Heater and ventilator controls, moving in a vertical plane, are now located at the driver's side of the panel. The efficient, thermostatically-controlled heater continues unchanged as an accessory at extra cost. The instrument panel is finished in body color except on DeLuxe model which has the upper half faced with resilient "Royalite" in a color matching the leather seats. The estate car has a felt mat with P.V.C. plastic over the rear compartment floor, held in place by plated rubbing strips.

There are eight colors from which to choose on the Super, five on the Standard Victor, nine for the estate car and 12 on the DeLuxe. These include four two-tone combinations and on estate car and five on the DeLuxe Saloon. Upholstery is in leather for DeLuxe models, vynide for the others, and tygan/rayon on export models.



VAUXHALL VICTOR

* * *

A MORE POWERFUL ENGINE, bigger brakes and wheels and revised styling highlight the '61 versions of the Velox and Cresta models of the Vauxhall. First off, the horsepower has been increased from 94.6 hp to 113 hp. This new 2.6-liter six-cylinder engine has a compression ratio of 8.1-to-1 as compared to 7.8-to-1 last year. The 113 hp is reached at 4800 rpm as opposed to the 94.6 hp at 4600 rpm in the old engine. This new "square" Six, with a bore of 82.55mm, gives a torque of 130 lbs.-ft. all the way from 1100 rpm to 4500 rpm, which is considerably more than the older engine.

The clutch has been increased to nine inches in diameter to handle the increased power. Acceleration, maximum speed and top gear flexibility are all improved; the power-to-weight ratio is now 96 brake horsepower per ton. Car weight is increased 50 pounds.

To compensate for the added power, the brakes have been restyled and now feature 10-inch drums on the front wheels. The total lining area is 147 square inches. Wheels have been increased to 14 inches. An optional accessory on both models is the power-assisted braking. Provided by a hydraulic and vacuum servo unit, especially designed for Vauxhall in 1957, the option runs about $38 extra. The purpose of the new unit is to reduce the pressure needed on the pedal, and it achieves this goal by reducing the pressure by more than 50 per cent. The compact, self-contained unit is mounted on two brackets on the offside of the engine, and powered by vacuum from the induction manifold. A vacuum reservoir is incorporated in the servo, so that two full-power brake applications can be obtained even with the engine stopped.

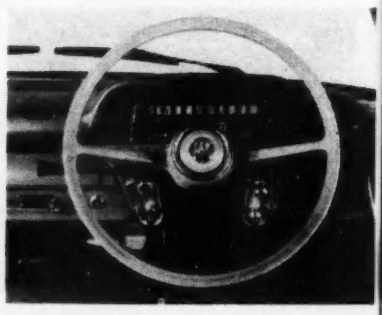
The forged steel crankshaft runs in four bearings and has an overlap of 7/16-inch between main and big-end journals. The pushrod-operated overhead valves lie in separate smooth-finished ports and are of composite construction with wear-resistant stems welded to heat- and corrosion-resistant heads. Die-cast aluminum rocker shafts are an interesting feature of the new engine.

Combustion chambers are wedge-shaped, while pistons are tin-plated, with offset piston pins and chromium-plated top rings. The crankcase is ventilated with filtered air and vented to the carburetor air cleaner. For uniform cooling, there is a coolant distribution duct inside the water jacket. Ratios in the three-speed gearbox are unchanged, but the axle ratio is now 3.9-to-1 instead of 4.11.

Other features include stronger front springs, a stiffer forward underbody structure and fitted, new rubber-cushioned front engine mounts. The Laycock overdrive is available on both models at extra cost. Parking lights and flashing front indicators are now combined in a single unit at each side of the grille, while rear lights are redesigned in a similar casing. The rear bumpers are new.

The newly designed instrument panel is in a hooded cluster in front of the driver and features a ribbon-type speedometer indicating first in green, then in amber and finally in red, when the speed of 60 mph or over is obtained. The upper part of the panel has a resilient "Royalite" covering, while upholstery is leather or nylon for Cresta, Vinyl or Vinyl-coated rayon for Velox.

The new instrument panel of the 1961 Velox and Cresta models of the Vauxhall shows tasteful design, with good view for the driver. The speedometer is a ribbon-type and indicates speed with colors—green, amber and red, for more than 60 mph. The two new models also feature a more powerful engine, bigger brakes and revised styling.



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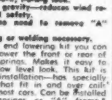

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FITS ALL TIRES!

Fits over the spare tire in trunk. Simple to install. Convenient for storing tools, shoes, flashlight and other car needs. Eliminates trunk rattle. Made of durable leatherette, sewed with nylon thread.

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BOOKS THAT TELL AND SHOW YOU HOW—

To Fix: Your Ford— Your Chevrolet— Your Plymouth—

FIX YOUR CHEVROLET HAND BOOK
For all models 1940 thru 1957. 232 pages of instructions and illustrations.

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Ford Model "A" Service Manual
All service information on model A's.

No. 276	—Each—POSTPAID	$1.00

Renault (Dauphine) Owner's Hand Book.
For repair and maintenance. Over 185 pages with 150 illustrations.

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Over 144 pages with 150 illustrations on care and servicing of VW.

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Chevrolet Speed Manual.
How to speed tune Chev. and GMC engines. Complete how-to-do-it information. 128 pages.

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Model A&T Ford Owner's Hand Book.
Contains 576 pages of information and instructions on operation and maintenance of both "T" and "A" models.

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"WIND-UP" SPORTS CAR KEY

Here is a tough-getting gadget everyone will envy. Oversize (14" wide x 7½" high) wind-up-type key can be attached anywhere—at the back of your small foreign or sports car, on the door of your bathroom, on the trunk deck of any car, etc. It will create comment and bring a chuckle wherever it is seen. Made of high impact plastic with heavy duty rubber suction cup. Will stick tightly on any clean surface by just wetting suction cup before using.

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For Customizing Ford, Mercury, Chevy, Pont. & Plym.

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Replaces factory hood ornament. Blends perfectly with moulding. For the following cars:

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"Hollywood" Wolf Whistle

Intake manifold whistle gives the wolf call, imitates a barking dog and other effects. Simple to install—works off the intake manifold.

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FIX YOUR PLYMOUTH HAND BOOK
For all models 1946 thru 1957. 224 pages of instructions and illustrations.

No. 118	—Each—POSTPAID	$2.98

FIX YOUR FORD HAND BOOK
For all models 1932 thru 1957. 224 pages of instructions and illustrations.

No. 119	—Each—POSTPAID	$2.95

Ford Model "A" Service Manual
All service information on model A's.

No. 276	—Each—POSTPAID	$1.00

Renault (Dauphine) Owner's Hand Book.
For repair and maintenance. Over 185 pages with 150 illustrations.

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Volkswagen Owner's Hand Book.
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Chevrolet Speed Manual.
How to speed tune Chev. and GMC engines. Complete how-to-do-it information. 128 pages.

No. 360	—Each—POSTPAID	$2.00

Model A&T Ford Owner's Hand Book.
Contains 576 pages of information and instructions on operation and maintenance of both "T" and "A" models.

No. 361	—Each—POSTPAID	$6.00

EXHAUST CUTOUTS For All Cars & Trucks

Fits All Exhaust Pipes to 2½" Diameter. Permits exhaust gases to be controlled from dash. Gives you TWO exhaust systems in one. WIDE OPEN EXHAUST system for road and country gives you:

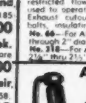
- INCREASED HORSEPOWER
- INCREASED GAS MILEAGE
- FASTER ACCELERATION
- IMPROVED PERFORMANCE
- HIGHER TOP SPEEDS
- REDUCED ENGINE HEAT

Closed quiet exhaust for city and restricted areas.

Cutout has extended outlet for use with flexible tubing or exhaust pipe, where auxiliary pipe is desired. Cutout is of heavy gauge steel all welded construction—actually strengthens the exhaust pipe. Completely mechanical—no springs to break or fail. New deep valve seat below pipe level gives positive, perfect seal when closed. Angled outlet permits free unrestricted flow through outlet. Can also be used to operate two different toned mufflers. Exhaust cutout is complete with all bolts, insulating asbestos, and dash control.

No. 66	—For All Exhaust Pipes through 2" diameter	POSTPAID EACH $2.89
No. 318	—For All Exhaust Pipes 2¼" thru 2½" diameter	

AERO type SHOCK ABSORBER Conversion KITS for MODEL A & B Fords, 32-48 Ford V8



- Replaces the Hard to Get Front Shock Absorbers of 32-48 Ford Passenger Cars.
- Choice of Black or Chrome Finish Brackets.
- For Stock or Dropped Axles. Easy to Install.

Install a pair of these new hydraulic under action airplane type shock absorbers on your Ford. Enjoy that extra smooth, more comfortable ride, added safety and better car control. Specially designed brackets in this kit make it easy to replace those old, worn original type shock absorbers.

Conversion Kit contains one pair of brand new airplane type shocks complete with bushings, right and left mounting brackets, one pair of lower mounting studs, washers, nuts and easy to follow installation instructions. FOR FRONT ONLY.

FOR STOCK AXLES

Stk. No.	Per kit
300 —Kit with black brackets	$19.95
301 —Kit with chrome brackets	22.50

FOR DROPPED AXLES

Stk. No.	Per kit
302 —Kit with black brackets	19.95
303 —Kit with chrome brackets	22.50

"LUCKY" Gear Shift KNOBS
FIT ALL gear shift levers

New, novel gear shift knob! The first to have them. 8 ball knob is 1¾" in diameter—all black with figure 8 on white background. Lucky dice knob is 1¾" in diameter—all black dots. Made of composition plastic.

No. 428	—Dice knob. each	1.50
No. 429	—8 Ball knob. each	1.50

MANUAL TRUNK KIT

Streamlines rear deck lid. Retains push-pull handle, operate from inside of car. Complete with instructions. Can be installed easy. To install on: Merc. 39-59, all GM 49-58 cars, 49 Olds 98, 54-56 Chrys. Deluxe, Dodge, 53-59 Plymouth.

State Year, Make and Model.

POSTPAID. Each		$1.49

AH-OOO-GAH Chromed HORN

Here it is for the sport car enthusiast. Vibrator or other substitute but a genuine motor driven horn.

Chrome Plated Bell with Black Wrinkle Painted Housing. State 6 or 12 VOLT

No. 60—POSTPAID.		$12.60

All Chrome Plated Bell and Housing. Weatherproofed for surface mounting. State 6 or 12 VOLT

No. 63—POSTPAID.		$15.00

PIN STRIPING
The Newest and Latest Custom Design Choice of White, Gold, Black, or Red

Ready-made original design striping, easily applied in minutes. Can be applied on any clean, dry surface. Will not chip, peel or fade. Kit contains fifteen decals in nine different designs up to 6½".

Will stripe an entire car, fenders, trunk lid, hood, skirts and other parts. Specify color when ordering. White, Gold, Black, Red.

No. 328—POSTPAID. Per Kit		$1.00

Deluxe Custom Styled STEERING WHEELS for 28-60 FORD
For Custom-Rod or Stock

- 13" DIAMETER LEAVES MORE LEG ROOM FOR CHOPPED OR CHANNELED ROD.
- RECESSED CENTER HUB — FOR EXTRA SAFETY.
- Beautiful combination of Ivory—Black and gold.
- Easy to install.

Deep-dish type steering wheel that replaces original equipment perfectly. Fashioned of plastic teeth in mottled ivory and black with gold flecks—colors cannot fade or wear off. Smaller 15" diameter leaves more leg room, permits faster turning, greater maneuverability. Strong steel core, plus center hub ornament. For fast-operated horn button, see below.

For 28-48 Fords. No. 555	—Each	$11.95
For 49-60 Fords. No. 556	—Each	$11.95

CHROME PLATED DISTRIBUTOR CAPS For All CARS

Sparkling Dress Up Your Engine with These Beautiful Chrome Plated

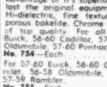
The most exciting accessory you can add to your engine. It really gives it that dressed-up touch. It's easy to install. Replace original equipment caps perfectly. Not only adds beauty to your engine, it also has the added advantage of it's superior construction to outlast the original equipment caps. Molded of Hi-dielectric, fine textured, powdered, non-porous bakelite. Chrome plating of the cap is of top quality. For all cars, except 57-60 Buick, 56-60 Cadillac, 57-60 Chevrolet, 56-58 Oldsmobile, 57-60 Pontiac, and 57-59 Rambler.

No. 754—Each		Postpaid $4.95

For 57-60 Buick, 56-60 Cadillac, 57-60 Chevrolet, 56-58 Oldsmobile, 57-60 Pontiac, and 57-59 Rambler.

No. 755—Each		Postpaid $6.75

MELLOW TONE Fiber Glass Packed MUFFLERS



Custom designed and engineered to fit each make and model of car—no alterations necessary.

Increases horsepower, increases gas mileage, straight-thru construction, no back pressure, no high pitch irritating noises, deep powerful non-offensive tones. Be sure to Specify Make of Car, Exact Year & Model, Type of Transmission, Single or Dual Exhaust.

Stk. No. 37—Each		$4.95

Car Club Jackets

CHOICE OF FIVE DESIGNS

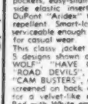
Whether your sport is hot rods, sport cars, boats, ½ midgets or chess, here is a jacket that fits any pocketbook or club treasury. It's a colorful, high quality coat that is carefully tailored from the finest Dan River sanforized, washable poplin in sturdy wind-breaker styling. Has such desired features as roomy corded pockets, easy-sliding zipper front, comfortable side elastic inserts—and it is treated with DuPont "Aridex" to make it water and spot repellent. Smart-looking enough for dress-up, serviceable enough for work, economical enough for casual wear.

This classy jacket is available in any of the 5 designs shown above: "NO CLUB—LONE WOLF", "HAVE GOODIES—WILL TRAVEL", "ROAD DEVILS", "NIGHT PROWLERS", or "CAM BUSTERS", which are permanently silk-screened on back of jacket, and then flocked for a leather effect. Niche colors of Royal Red with White emblem, Blue with White emblem or White with Black emblem. Men's sizes: Small, Medium, Large, or Extra-Large.

When ordering, be sure to specify jacket color, size and emblem desired.

No. 502	—Each	$6.95

"Stop Car Thieves" with this Auto Burglar Alarm



Let this private police-man protect your car 24 hours a day—completely automatic. Horn blows intermittently if car is disturbed. Easily shut off automatically. Easy to install.

Here is the only all-out protection against accessory, tire, gasoline, and auto thieves. Alarm installs under car hood and automatically blows car horn intermittently the instant anyone touches part of the car—and continues to blow it for approximately 15 seconds after car is left unmolested. Simple set switch that attaches to dash upon leaving car. Upon contact, alarm scares thief away. With complete instructions for simple, quick installation.

No. 17—	POSTPAID—Each	$2.50

DUAL MUFFLER EQUALIZED EXHAUST SYSTEM for 1960 CORVAIR
Complete with 2 Steel Packed Sports Car Mufflers

Makes a real sports car out of the 60 Corvair.

- Reduces Back Pressure.
- Increases Gas Mileage.
- Increases Horsepower.
- Increases Top Speed.
- Easily installed in approx., 15 minutes—nothing else to buy.

The simplest, easiest and most economical way to improve the all-around performance of the '60 Corvair is to install this dual muffler and equalized exhaust system. Eliminates back pressure and congestion of crossover pipe and stock mufflers—allows exhaust gases to flow freely and let the engine deliver its top power, its top economy. Easy to install—just remove old muffler and pipe—install the dual muffler exhaust system. Takes only minutes, and you're ready to enjoy sports car performance from your '60 Corvair engine. Kit contains 2 steel packed sports car mufflers with hangers attached, 4 dual equalized exhaust systems, 2 curved extension tubes for mufflers, all necessary hangers, brackets and instructions.

No. 688	—Per Kit	$23.95

CAST IRON EXHAUST CUT-OUT

For All Cars with Exhaust Pipes 1½" to 2½"

Exhaust line is controlled from the dash. Can be used as a cut-out in the country and closed in restricted areas. Can also be used to operate two different toned mufflers. Stands cast iron construction. Easily installed.

No. 613—Each		$3.75

SEAT COVERS FOR 28-31 MODEL "A" FORD
CHOICE OF 2 STYLES
CHOICE OF 3 FABRICS—EACH IN 4 COLORS

Now . . . available for the first time in many years, perfect-fitting seat covers for the famed Model "A" Ford! Make your selection from either of two styles, Style "A", which has solid back and seat, or Style "B", which has contrasting leatherette bolster trim. Choose the style you desire in any of three fabrics: (1) Simulated Leather; (2) Saran Plastic; or (3) Plastic Coated Fibre. Choose the color you desire from these four: Red, Blue, Green or Black. All styles and fabrics have supported upholstery. All three fabrics are fully vented throughout for easy cleanability . . . can be wiped clean with just a swish of a damp cloth. Shipped from New Jersey.

LEATHERETTE:	No. 903—Complete Set	$36.50
	No. 904—Front Seat Only	13.95
SARAN PLASTIC:	No. 905—Complete Set	$37.95
	No. 906—Front Seat Only	13.50
FIBRE:	No. 907—Complete Set	$19.50
	No. 908—Front Seat Only	10.50

Installation pliers not required with Model "A" covers.

USE THIS HANDY ORDER FORM — MAIL TODAY!

JC WHITNEY & CO
1917 0-210 Archer Ave., Chicago 16, Ill.

I enclose Check or Money Order $ _____ to cover payment in full. Please do not send currency or stamps. We pay postage on items marked POSTPAID when full payment accompanies order, you pay shipping charges on items not marked POSTPAID. Minimum C.O.D. order accepted must be $5.00 or more—enclose at least 25% deposit, pay balance plus all shipping charges upon delivery.

Name _____

STATE—My car is a _____ Year _____ Model _____ No. of Cyl. _____

Address _____

City _____ Zone _____ State _____

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Quantity	Stock No.	Description	Price

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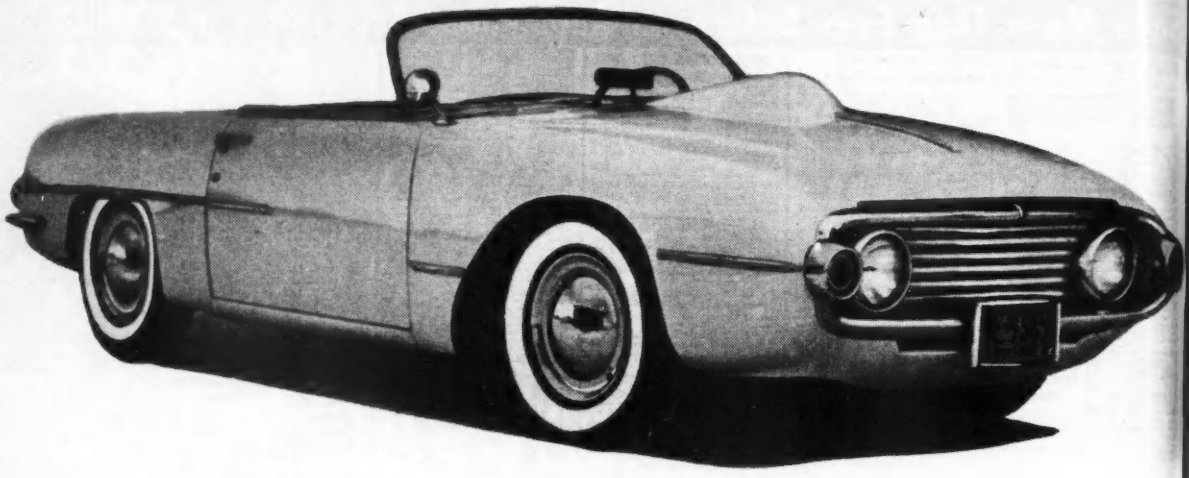
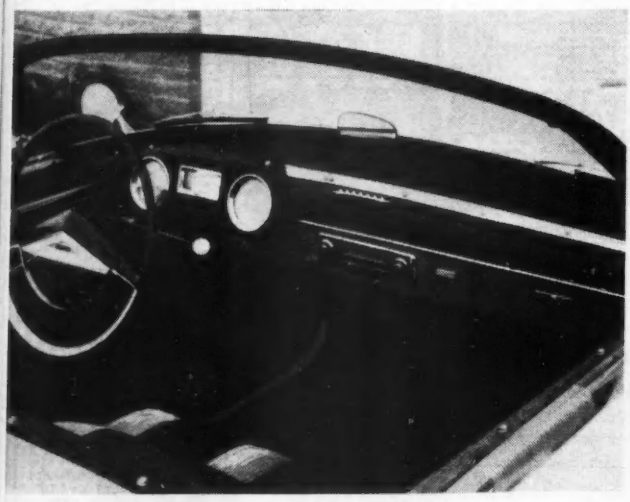
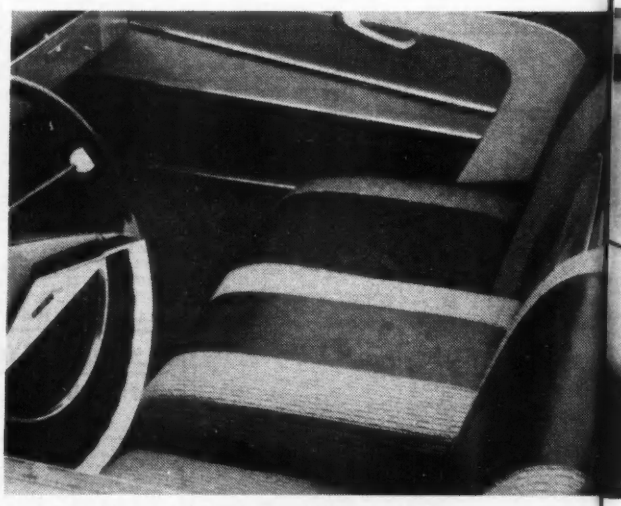


NEATLY DONE '51

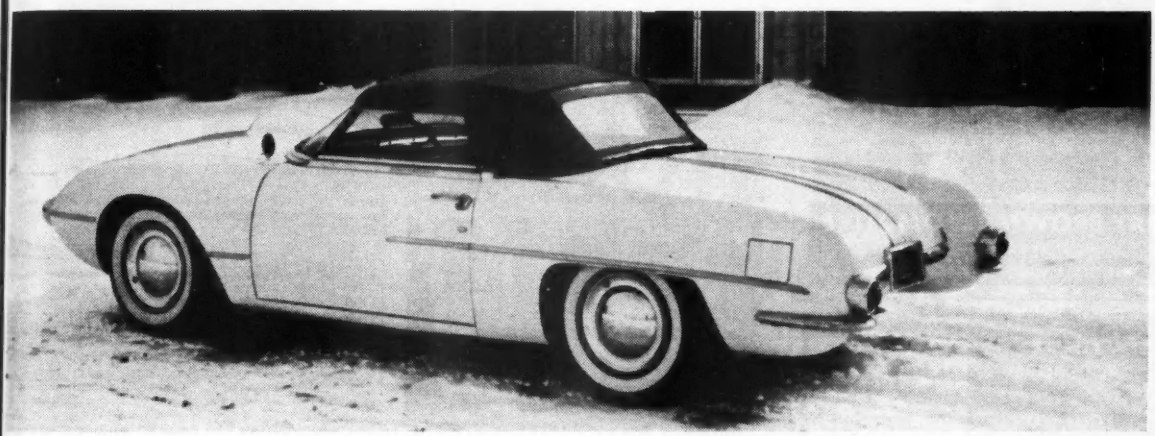
With skill, patience and a clever choice of adaptable parts, Eugene Eick has come up with a racy modern disguise for a nine-year-old Ford.

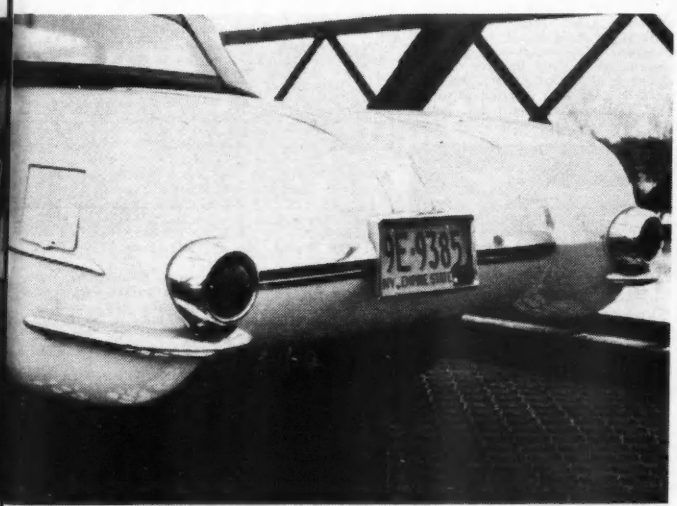


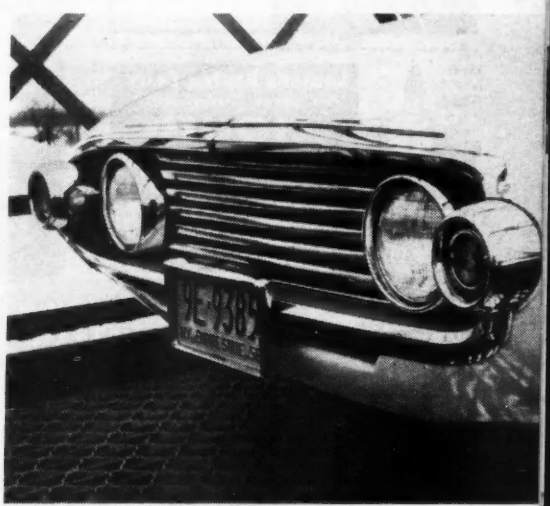


Skilled craftsmanship marks a unique custom built by Eugene A. Eick of Middleport, N. Y. Originally a '51 Ford, the car has been converted into an open roadster with sheet metal and body parts from six different makes. The modern-looking wrap-around windshield, for example, is actually a '51 Mercury rear window. Interior finish, shown above, is in black and gray to complement white body paint. Eick uses the car for his everyday driving and, during winter, fits a removable fabric top and plastic windows. Construction took eight months, cost about $900.

A ground-hugging look results from lowered springs. Housings for parking and tail lights are '50 Buick bumper guards. Eick modified the frame to cut the wheelbase to 100 inches.







Much of the sheet metal, rather than being especially formed, is from other cars. Panels for the hood and deck were made from the center parts of four car tops, front fenders are '51 Ford with forward contours from '50 Plymouth hood sections, and the rear quarters are adapted from a '51 Mercury. The roadster is Eick's third and most successful try at "cut and fit" customizing, the others being a '33 Plymouth and '46 Crosley Hotshot. A '51 Ford engine still powers the car but will be replaced by a Chevrolet V-8 some time next winter.

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TESTED COMFORT FOR ROAD OR RACE

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These outstanding DRIVING GLOVES are made of native North American DEERSKIN. Soft as chamois, yet rugged as any glove leather known. Deerskin's ability to "breathe," combined with our exclusive perforated design, guarantees perfect ventilation and comfort to the hand. Its texture provides an exceptionally sensitive NON-SLIP GRIP on the wheel; it is completely washable.

Construction includes these rarely used quality features: gloves are fully table cut, with gauge sewn inseams to insure no scrimping in the fingers—they are elasticized at the wrist and back for snug fit. The tiny palm perforations guard against blistering. Color: Saddle. Men's Sizes 7-11½ $7.95 pr.

TO ORDER: Send check or money order for $7.95. Please be sure to state size. Gloves sent ppd. Sorry, no C.O.D.

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Cornell University crash injury studies indicate that if you are ejected from an automobile during an accident, the risk of fatality is five times greater than if you remain in the car.

Approved 5000 lb. impact auto safety belts—friction & metal to metal design—100% DuPont nylon webbing—all colors—write for prices and literature.

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SELL

'41 PACKARD 110 conv. Orig. uph.; 35,000 orig. mi.; runs good. Needs fender work. $250. Dallas Hofmann, Rt. #2, Fairbury, Ill. Phone 299-M.

'38 CADILLAC 4-dr. sed., with sidemounts. In running cond. $290. Joe Molina, 310 Forrest, San Antonio, Tex.

'33 FRANKLIN Pirate conv. sed. New: paint, top, uph., incl. door panels. Engine & tires exc. Have all major parts, incl. spare engine, to keep car going indefinitely. $3000 or best offer. Robert Albietz, 67 W. 55th St., Bayonne, N. J.

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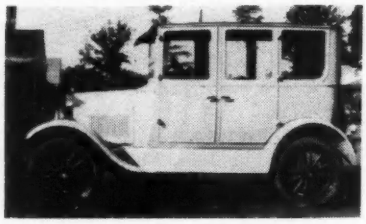
'25 MODEL T 4-dr. sed. Tall & tuned-up. Good engine, body, tires & transmission. Recent state



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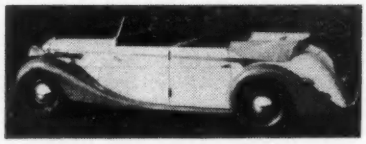
DAIMLER Type 27, fitted with magnificent alum. touring body by Vanden Plas. Built for Indian Maharajah; cost $16,000. Delivered New York



$2500. For pix, details, write Brooks, 154 Lancing Rd., Orpington, England.

TRIPPE SENIOR safety driving lights. 8½-in. dia.; 6- & 12-volt types available. Brand-new in orig. boxes. Come complete with all wiring, brackets, fittings & 2 Gulmite wrenches. $37.50 per pr., shipped prepaid & insured. A. Ward Shanen, 2444 S. Orkney St., Philadelphia 48, Pa.

DENMAN "HANDCRAFTED" rayon & nylon custom-built "classic tires" now available for all antique, vintage, veteran, classic & special-interest cars. All sizes, from 4.40/4.50 x 21 to 7.00 x 21 wide whitewalls. 50c for complete listings & descriptive literature. A. Ward Shanen, 2444 S. Orkney St., Philadelphia 48, Pa.

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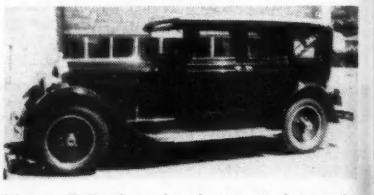
'33 BUICK 8-cyl. 4-dr. sed. Orig.; r & h, clock;

2 new tires. Exc. cond.; driven every day. Make offer. M. R. Cason, Darlington, S. C.

STEAM CAR'S 120 MPH—illustrated description of 1960 auto. Classics, antiques. Magazines over 50 pages ea., $4 yr. Dollar bills, money orders accepted (no coins). *Steam Cars*, Kirk Michael, Isle of Man, U.K.

'29 PACKARD Standard 8 4-dr. sed. 30,000 actual mi.; stored in heated building for past



26 yrs. Believed to be cleanest & finest orig. Packard in U.S. $3200 or best offer. Must sell quickly. Patrick A. Carlone, Tablyn Park, Lake Elmo, Minn.

STEAM CAR POWERPLANT PLANS—hundreds of details for lightweight car powerplant, switch-on start. $5. Also castings, assembled engines. Dollar bills, money orders accepted (no coins). *Steam Cars*, Kirk Michael, Isle of Man, U.K.

MOTOR ANNUALS (new stock)—issues '24-'43. Classic automobile catalogs, 500 different. Over 2000 different automobile ads, every make, every model, '24-'38. Listing 35c on *Motor* & catalogs. Please request auto ads. Sheldon J. Lewis, 61-33 213th St., Bayside, L.I., N.Y.

AUTOMOBILE LITERATURE—old, new, foreign; glossy photos, shop manuals, dealer books; free motor magazines. Non-profit organization. Auto Maniacs of America, Box 451, Mt. Clemens, Mich.

TUCKER AUTOMOBILE factory literature, order blanks, specs. of this fabulous car. Collectors' items. Send $1 for complete packet. J. Moore, Box 657 Grand Rapids, Mich.

'40 GRAHAM Hollywood, supercharged. Near mint—all orig., all new chrome. Licensed. Asking $1000. Leonard B. Bills, 3415 Lakeside Ave., Cleveland 14, Ohio.

COLLECTION of old Bosch 4- & 6-cyl. magnetos in good shape. 1 rare Bosch—D.R. 6, 2-spark. 2 each—4-cyl. Bosch & Eisemann, with impulse starters. Arthur H. Gray, 1086 Rt. 8, Glenshaw, Pa.

'34 HUPMOBILE cpe. For details write Mrs. R. D. Nestor, Auburn, W. Va.

'16 CHEVROLET "490" touring car (made by Chevrolet Bros.). Good cond.; used for display & advertising purposes last 12 years. Best bid over $1000. W. O. Mearns, P.O. Box 432, Liberty, Tex.

'49 LINCOLN Cosmopolitan presidential conv. Maintained by White House garage—leather & paint in perf. cond.; runs like new. Equipped with 2 spotlights, police generator & Secret Service running boards. $1000 or best offer. Lee Loecy, Orchard Rd., Chardon, Ohio. Phone AVenue 6-4124.

'23 PIERCE-ARROW cabriolet. Olive-green body & striping orig., incl. wheels. Uph. & interior orig. & clean; engine quiet. Complete & almost-showroom cond. $4700. 2 colored pix $1. F. Salkin, 26 Old Lancaster Rd., Merion, Pa.

'26 PIERCE-ARROW rdstr. Alum. body & fenders exc., engine exc., perf. running gear. Rare & beautiful model. Sacrifice for $1000. Pix 50c. E. Goodman, 26 Old Lancaster Rd., Merion, Pa.

'27 STUDEBAKER cpe. Orig. finish, good running cond., good tires. 34,800 mi. $150 or best offer. Jack Bergen, 67 Ridge Ave., Bridgeport, Conn.

'39 LINCOLN K conv. by LeBaron. 6 wheels, rumble-seat, trunk, golf bag door, power brakes. New paint, top, chrome, etc. Perf. cond. thruout; drive anywhere. $1375. Joseph Noll, 6793 Noll Rd., Harrisburg, Pa.

'39 LA SALLE Series 50 conv. cpe. Exc. cond.—used summers only. 3rd owner (8 yrs.). Great many spare parts. Pix 25c. Best offer. Bud Davis, Marlboro, Vt.

'48 CHEVROLET conv., with '52 GMC engine with 13,000 mi. In new cond.; needs no restoring. Ready to drive. $800. Kenneth Folk, 240 Ash Ave., Findlay, Ohio.

ANYONE INTERESTED in a Buick Skylark Club? The top car for style & performance should have the backing of an enthusiasts' organization. W. B. Hurlburt, 1202 W. 18th St., Cedar Falls, Iowa.

'48 LINCOLN CONTINENTAL hdtp., with '54 Cadillac engine, twin carbs. Dark blue; perf. & immac. cond. thruout. Must sell. Lewis Burwell, Box 92, Floyd, Va.

COLLECTORS . . . Automobile Ink Drawings. Set I. Cars of the '30s: '31 Ford, '32 Chrysler, '33 Oldsmobile, '36 Terraplane, '37 Dodge, '38 Lincoln Zephyr. 8½"x11" quality paper—suitable for framing or mounting. All 6 for $2. Watch for Set 2. Cole-Cars, 243 S. Whiteoak St., Apt. C, Kutztown, Pa.

'40 LA SALLE 4-dr. Glass insulation thruout; no rust. Mech. perf.; used every day—a delight to drive $800. L. L. Davis, 2309 Ave. E, NW, Winter Haven, Fla. Phone CYpress 4-2646.

SAC — SMALL AUTO CLUB. Free literature. Small & compact owners receive bumper badge, ID card, Newsletters, magazine subscriptions, etc. Many benefits for members. Write SAC, 1717 Walnut St., Philadelphia 3, Pa.

'40 LA SALLE conv.—last model made. Splendid preservation; orig. 15-in. wheels; many extras. $1492. James F. Steighner, 32 Lincoln Way East, Lincoln Heights, Jeannette, Pa.

FRONT FENDERS for Jaguar Mark VII. No holes, dents; sandblasted & primed. $50 ea. Also repairable front bumper, light parts. Paul C. Crum, 751 N. Central Ave., Chicago 44, Ill.

'30 REO 6 rdstr. Rumbleseat, sidemounts, 6 tires, trunk, golf club compartment. Restored—new top, uph., paint. Drive anywhere. Orig. manual. $1500. Glenn McColpin, 1415 Laurel Ave., Knoxville, Tenn.

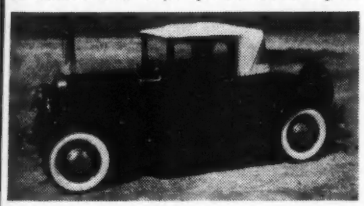
'49 CHRYSLER Town & Country conv.—a rare model in amazing cond. Gleaming black with

varnished oak trim. A beautiful semi-classic for only $595. H. Staples, R.F.D. 2, Limerick, Me. Phone PYramid 3-2779.

SELL OR SWAP

'57 FORD cpe. Black lacquer; top chopped 4 in., rear fenders extended 17 in. Continental kit, Chrysler headlights; television, air conditioning. Stock engine. Orig. owner. $3500. Pix, full details $1. James Ray, 821 Ray Dr., Birmingham 14, Ala. Phone STate 7-4460.

'28 CHEVROLET 4-cyl. cpe. Removable 1-piece



top; lacquer finish. New pistons, valves, bearings; extra engine & parts. $1000 or will trade for late-model pickup. Don Baxter, 1607 9th St., Woodward, Okla.

'41 LINCOLN CONTINENTAL conv., with exc. '55 Mercury engine. Black with white top. Good cond., used regularly—drive anywhere. $695 or best offer, or trade. Preston Hogue, Emory, Tex.

'38 GERMAN FORD conv. Very rare small car, completely restored a yr. ago. Can be driven anywhere. Must see to appreciate. $700. William Le Master, c/o Rex Radiator Service, 614 Shipman St., Peoria, Ill.

WANTED

'35 FORD rdstr., with body in good cond., not customized. Preferably in running cond. James L. Jenkins, 505 E. 39th St., Baltimore 18, Md.

OLD AUTOMOBILE CATALOGS . . . Paying premium prices for Cadillac, Packard, Stutz, Pierce-Arrow, Lincoln & Duesenberg catalogs. Also *Motor* Annuals & ATJ magazines (no books). Will top any offer. Sheldon J. Lewis, 61-33 213th St., Bayside, L.I., N. Y.

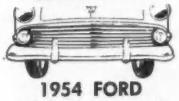
ORIGINAL OWNERS' instruction books, sales catalogs, shop manuals—any make 1900-'25, classics '25-'35. Also ALAM, ABT & NACC Handbooks. Prices & details in 1st letter, please. R. Pierce, 3517 Dollar Dr., Akron 19, Ohio.

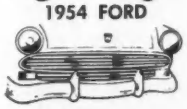
1959 FORD

1958 FORD & Thunderbird

1957 FORD

55-56 FORD


1954 FORD


1953 FORD

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59-60 CHEVROLET

1958 CHEVROLET

1957 CHEVROLET

1956 CHEVROLET

1955 CHEVROLET

1960 Corvair

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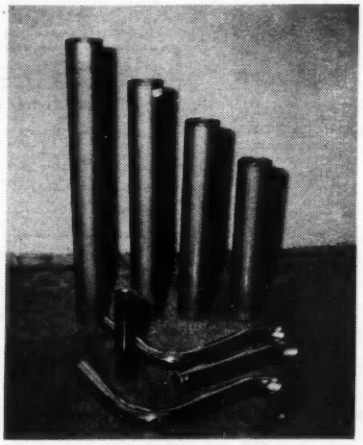
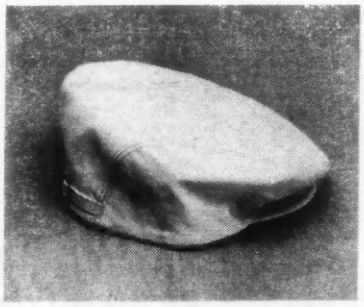
NEW PRODUCTS

CUSTOM INSTALLED TWIN-MUFFLERS are now available for all foreign cars. The steel-packed muffler will withstand the high temperatures which the imports generate. Constructed of heavy-duty, solid steel tubing, the pipes have electrically welded end caps. They are three inches in diameter and the lengths run



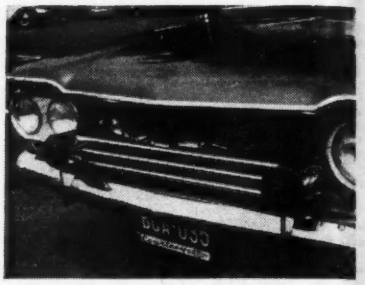
from 12 to 36 inches. Prices start at $6.50 per set, and information can be obtained from Hollywood Deep Tone Manufacturing Co., 21300 Sherman Way, Canoga Park, Calif.

ALL SPORTS CARS AND CONVERTIBLE BUFFS need this Ivy League cap. Made of genuine leather and lined with luxurious



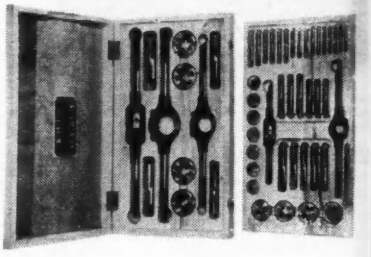
satin, the cap comes in five popular colors—beige, black, white, rust and brown. The cap comes in all sizes—6⅝ to 7¾—and each has an attractive belt-buckle on the back. Comfortable and smart to wear. The retail price is $4.50 and can be obtained by writing Webco., 218 Main St., Venice, Calif. and asking for Part No. 1172.

DRESS UP YOUR CORVAIR while protecting it with a combination grille and bumper. Constructed of heavy, but lightweight,



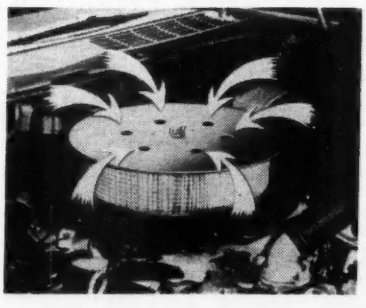
steel tubing, the bumper-grille has a high chrome finish for that smart, trim look. The spinners are hard rubber grommets that will protect both the bumper and grille. Easy to install. Just bolt on to the bumper in one minute. Price is only $24.95 and can be obtained from Safety Bar Manufacturing Co., 341 E. Camelback Rd., Phoenix, Ariz.

A NEW TAP AND DIE SET is now available for Volkswagen maintenance. Every thread size, both right and left, used on



a Volkswagen can be reproduced or restored with this set. Nested in an attractive hardwood, two-tray box, the complete set of chrome vanadium steel taps and dies sells for $80, which is less than half the price of sets now on the market. Information and sets can be obtained from EMPI, Box 668, Riverside, Calif.

GAIN ADDITIONAL POWER by installation of the air-injection Jet-Dome replacement air cleaner. Made of colorful anodized aluminum, it fits over the stock



filter unit on a carburetor. With Jet-Dome you can floor the throttle for bursts of surging power as six neoprene air valves pop open automatically to pass all the fresh air carburetors need to get you around in emergencies. The unit fits all popular cars—1955 and newer—and there is a money-back guarantee. One-minute installation and no tools are needed. Price is $6.95 and available from Vilem B. Haan, Inc., Automotive Accessories, 10305-07 Santa Monica Blvd., Los Angeles 25, Calif.

SPORTS CAR DRIVERS looking for driving gloves can stop their search and purchase a pair of deerskin driving gloves from

D. R. Currie, taxidermist. The gloves are the result of months of research and development and have been actively tested by drivers all over the world. The weight is ideal for all-year driving, and achieved by special tanning methods on naturally thin leather to keep it strong. This feature provides a sensitive, non-skid grip on the wheel, even when wet. Construction includes several quality features rarely used today—fully table cut, and gauge sewn inseam with a strong lockstitch. Elastic at the wrist and back. Men's sizes, 7-11½. Price is $7.95 postpaid in U.S., Canada or Mexico from D. R. Currie, Homestead Farm, Main St., Norwell, Mass.

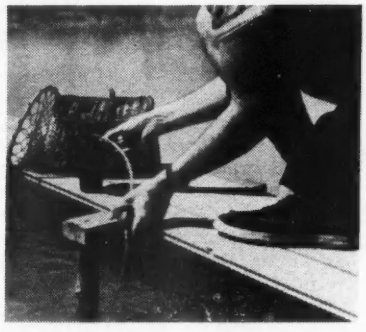
PERSONALIZE YOUR AUTOMOBILE with this name plaque. The highly chromed finish is weather resistant and makes it desir-

able for boat, trailer, hi-fi or other personal belongings. The plaque is self-adhesive and will stick to any flat surface. Plain plaque with name if desired. Delivery within 10 days, and there is a money-back guarantee. Price is $1.98 from Commander Enterprise, P.O. Box 2232, Oxnard, Calif.

A NEW LUGGAGE CARRIER has been announced for all compact station wagons

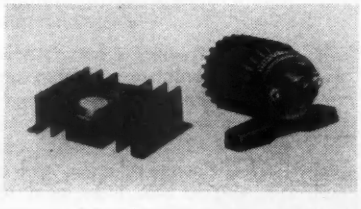
and sedans. Constructed of aluminum throughout, including castings, rails and platform; cannot rust or corrode; stainless steel screws and bolts; highly polished one-piece rails; and factory-assembled platform. All parts are cushioned and headlining is not disturbed by installation. Other models also available at your dealer, or write Canell Co., 61 S. State St., Hackensack, N.J.

DON'T DRINK UNSAFE WATER! Instead purify it with the Nordskog Water Purifier. Used by most airlines to purify drinking water for their passengers in foreign countries, the unit has been adapted for use by outdoor sportsmen and tourists who must use unfiltered drinking water in their travels. This same unit is used by the Air Force in their survival kits and weighs less than one pound. It has been approved by



U.S. Testing Laboratory, and eliminates all dirt, bacteria, amoeba and virus from the most unsanitary water. Priced at $12.95, the units may be purchased from the Nordskog Filter Division, 2915 W. Olympic Blvd., Los Angeles 6, Calif.

THE FIRST TRANSISTORIZED circuit for the ignition system has been announced by Auto-Marine Laboratories of Ramsey, N.J. The system consists of hermetically



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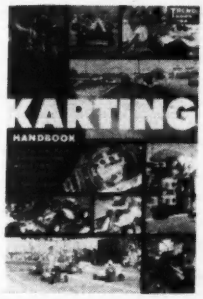

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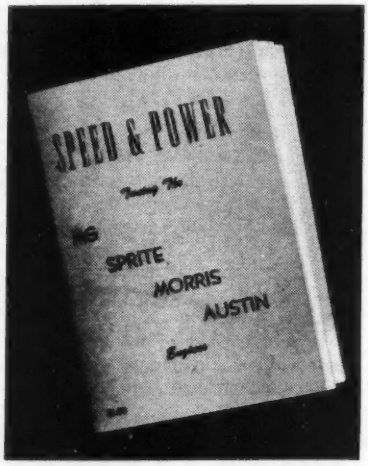
NEW PRODUCTS

continued

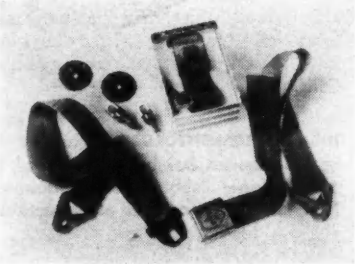
sealed ignition coil and sealed transistor circuit with heat sink and hardware needed for easy installation. Advantages include increase of gas mileage, more dependable cold-weather starts, high-speed performance, with less maintenance. It is moderately priced and information can be obtained by writing Auto-Marine, 6 E. Main St., Ramsey, N.J.

SPEED AND POWER TUNING INFORMATION for MG, Sprite, Morris and Austin engines is presented in detail in a new



40-page book from Nor Cal Engineering. The book, a $2.50 value, explains factory stages of tuning and includes diagrams and drawings of head porting, etc. It is accompanied by a new catalog of sports and imported car accessories developed by the firm. Charge for both books is $1, and they can be obtained by writing Nor Cal, Dept. MT, 2060 Portola, Stockton, Calif.

ADDING FASHION TO SAFETY, Hickok announces its "Royal Traveler" safety belt.

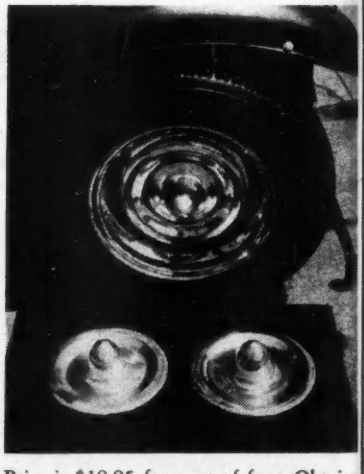


The new belt features a jewelry-styled buckle, color-coordinated webbing, new ease of installation, and is gift-packaged. The all-nylon washable webbing comes in a choice of 12 colors including dusk gray, black diamond, palm green, flame red, navy, skipper blue, ivory pearl, sun beige, cocoanut brown, Indian turquoise, claret, and buttercup. The "Royal Traveler" is able to withstand 5000 pounds of "loop load" and meets or exceeds the latest government specifications. Retail price is $12.95.

A NEW RECESSED HUB STEERING WHEEL is now available. It is finished in black

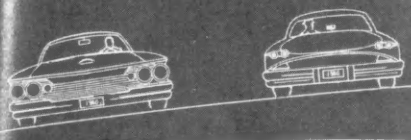
nickel with molded neoprene rim and has finger grips for positive grip and driving comfort. The 17½-inch championship model sells for $46. For use where space is at a premium, as in dragsters and karts, there is an 11½-inch model. It has all the features of the larger wheel, but comes in chrome. Price is $30. They are available from nearest Cragar dealer or write Cragar Equipment Co., 3633 E. Gage Ave., Bell 15, Calif.

THE LATEST IN WHEEL COVERS is the R&H wheel cover. Designed as a combination disc and spinner, it is available in polished spun alloy or chromed steel. No trouble to install—just snaps on. Specify wheel size and make when ordering.



Price is $19.95 for a set of four. Obtainable from Cal Automotive, Box 85282, Dept. MT, Los Angeles 27, Calif.

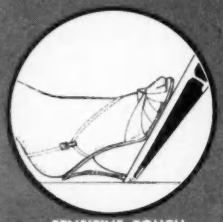
RELIABILITY FOR ALL OF TODAY'S DRIVING



YOUR THROTTLE FOOT KNOWS THE DIFFERENCE

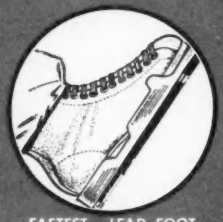
Grant PISTON RINGS

'Around the World!'



SENSITIVE TOUCH

FAST TOUCH

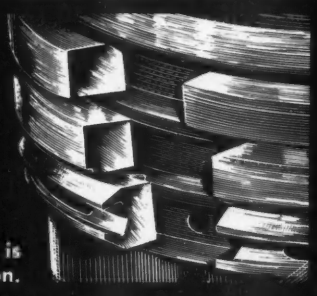


FASTEST – LEAD FOOT

With this ring combination, superior POWER is controlled by a continuous, moving cushion of oil.

You get top 'DRAG FREE' power at all speeds with GRANT.

Instant Throttle Response is due to GRANT'S 3-Way Action.



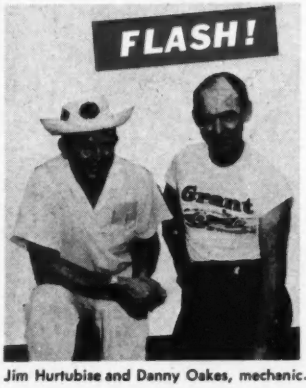
FLEXING - TORQUING - FLUSHING

Throttle-wise drivers know the "feel" of a good engine — know the whys and the reasons giving the feel.

GRANT's application of time-proven ring designs and materials combine to spell reliability under all driving requirements.

JOBBERS: We have a "just right" introductory inventory for your needs. Drop us a line.

FLASH!



Jim Hurtubise and Danny Oakes, mechanic.

Using the combination of GRANT Piston Rings and GRANT Forged Pistons at Indianapolis, Jim Hurtubise electrified the racing world with his 149.601 mph . . the fastest ever!

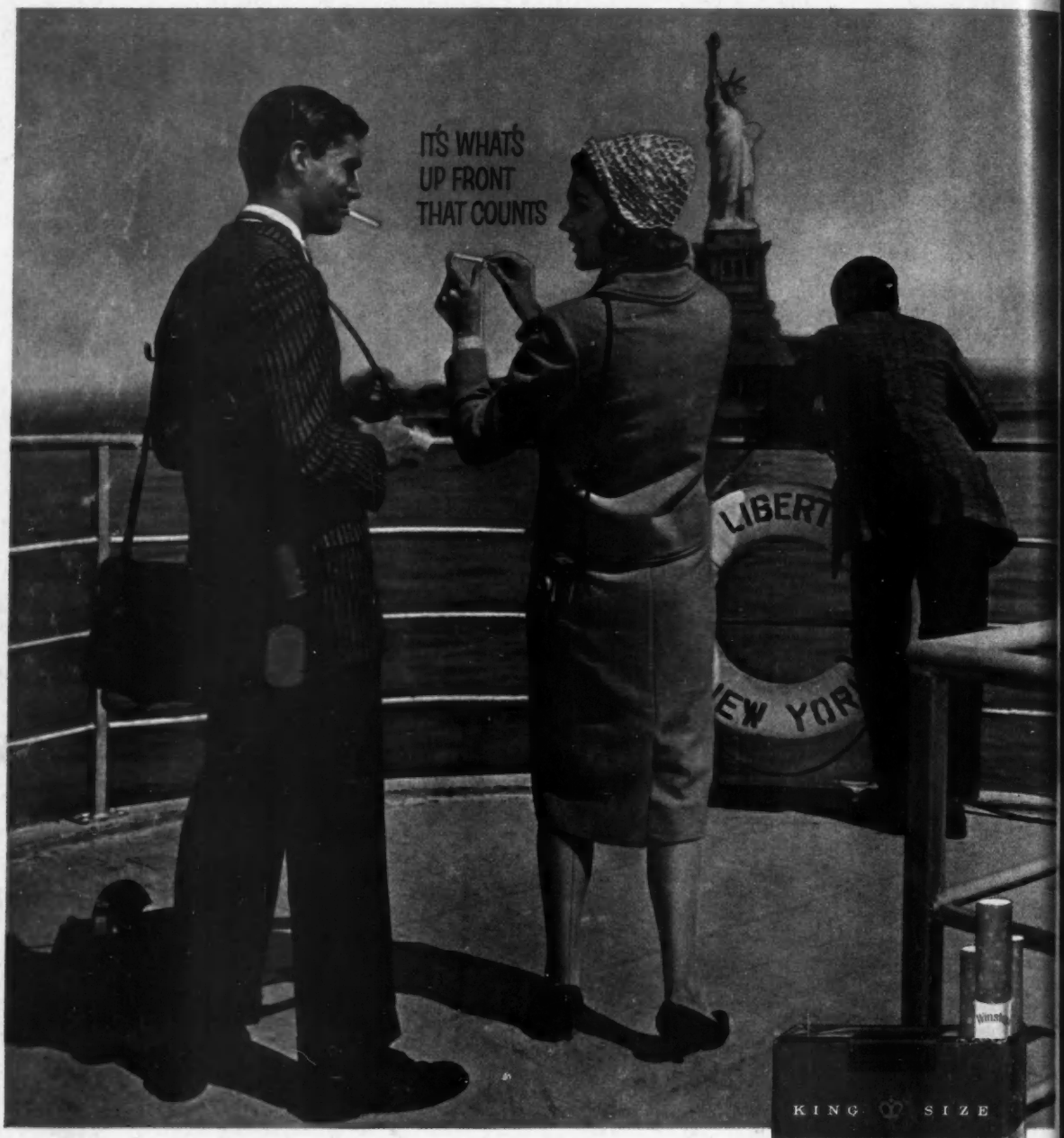
Using GRANT Forged Pistons, Eddie Sachs took Pole Position at Indianapolis.

Using GRANT Forged Pistons 7 drivers, out of the first 10 places, won.

Let GRANT furnish you the one best piston ring combination for your engine.

Grant PISTON RINGS

Grant and Grant, 241 N. Westmoreland Ave., Los Angeles 4, Calif.



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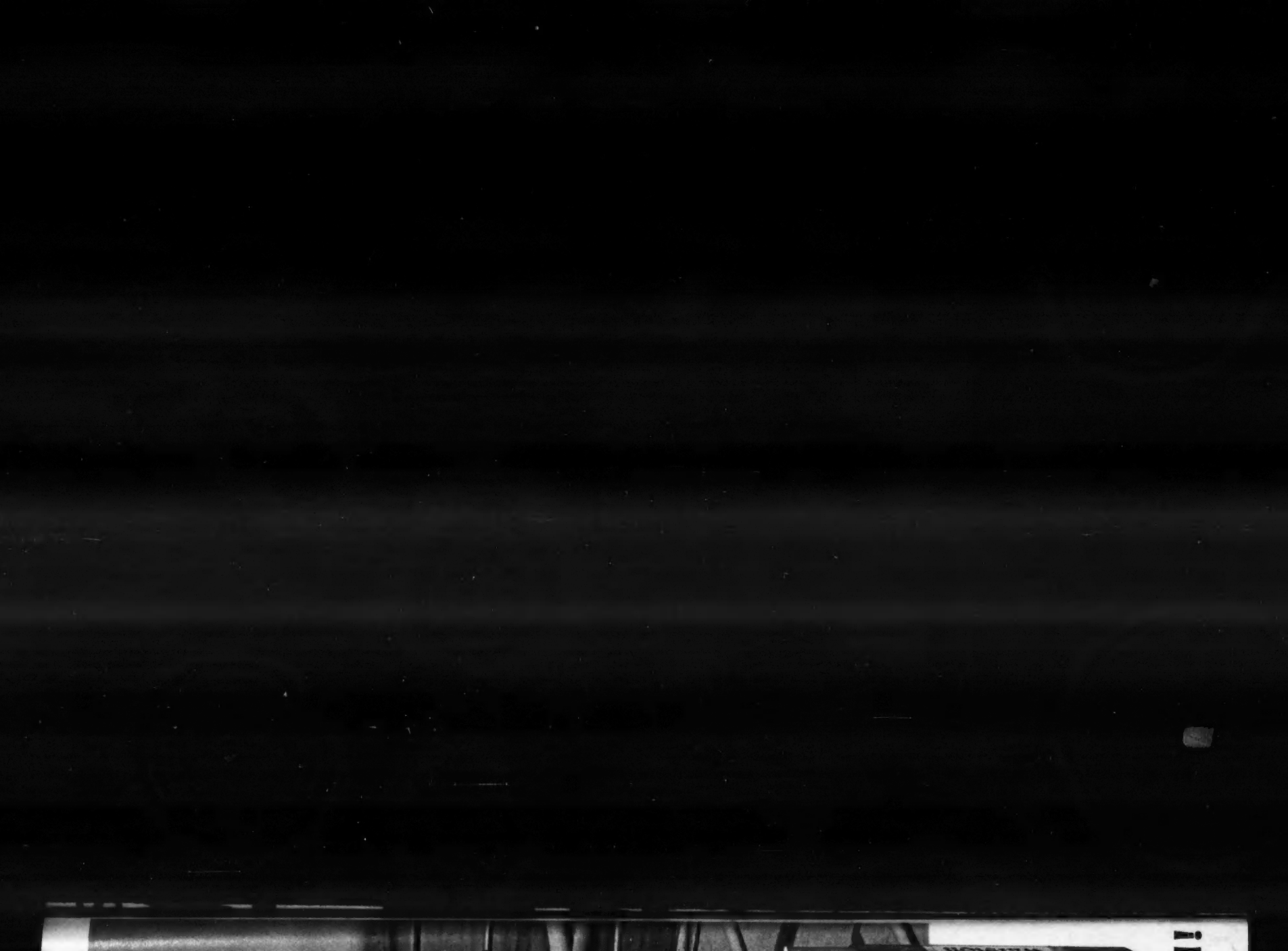
Good taste in filter smoking began with Winston Cigarettes. What makes the difference is FILTER-BLEND, an exclusive Winston development that goes up front of the modern Winston filter.

Rich, golden tobaccos *specially selected* and *specially processed* for filter smoking . . . that's FILTER-BLEND. And that's why Winston is America's best-selling, best-tasting filter cigarette.

R. J. REYNOLDS TOBACCO CO., WINSTON-SALEM, N. C.

Also available in crush-proof box.

Winston tastes good—like a cigarette should!